NETWORK WORLD
The Newsweekly of User Networking Strategies
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U.S. to study Soderblom token patent

By Laura DiDio
Senior Editor

WASHINGTON, D.C. — In a move that could spell trouble for Olof Soderblom's token-passing patent and monetary relief to his 50 licensees, the U.S. Patent and Trademark Office has agreed to reexamine the validity of Soderblom's patent.

In its 1½ page decision, the Patent Office stated that the reexamination request from an anonymous vendor was granted in view of earlier patents issued to four engineers — including two from AT&T Bell Laboratories — before Soderblom was granted his patent in 1981.

"A substantial new question of patentability affecting Claims 23 to 33 of U.S. Patent No. 4,493,948 to Soderblom is raised by the request," the Patent Office statement said.

The 10 claims in question deal with open and closed data transmission loop schemes and are central to the issue of whether Soderblom's existing patent is applicable to today's token-ring and Fiber Distributed Data Interface local-area network technologies.

Invalidation of the patent or amending even portions of the patent could effectively render null and void the current licens-

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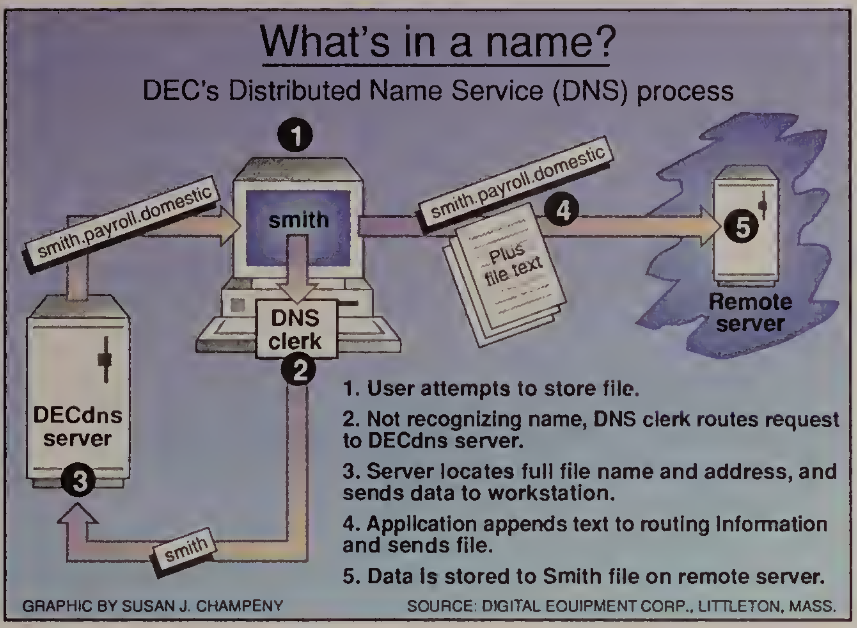
What's in a name?

DEC's Distributed Name Service (DNS) process



1. User attempts to store file.
2. Not recognizing name, DNS clerk routes request to DECdns server.
3. Server locates full file name and address, and sends data to workstation.
4. Application appends text to routing information and sends file.
5. Data is stored to Smith file on remote server.

GRAPHIC BY SUSAN J. CHAMPENEY SOURCE: DIGITAL EQUIPMENT CORP., LITTLETON, MASS.

DEC describes benefits of X.500 directory services

X.500 will extend DNS offering to incorporate non-DEC devices in DECnet Phase V directories.

Later this year, Digital Equipment Corp. is expected to announce DECnet Phase V, a major revision of its network software that will support the full suite of Open Systems Interconnection protocols.

According to Jane Brewer, DEC's product marketing manager for enterprise networking within DEC's Telecommunications and Networks Organization, one key component of that announcement will be support for the X.500 directory services standard, which promises to give network administrators greater control over the hardware and software elements in their networks.

In an interview with *Network World* Assistant Managing Editor Charles Bruno, Brewer described the full potential of X.500 directory services and laid out DEC's strategy to support the technology within DECnet Phase V.

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Microsoft to market LAN Manager direct

Software giant to sell NOS to Compaq resellers to stabilize LAN Manager camp, jump start sales.

By Laura DiDio
Senior Editor

REDMOND, Wash. — In an attempt to boost lagging sales of its LAN Manager network operating system, Microsoft Corp. last week announced it will sell a version of the product directly to select Compaq Computer Corp. value-added resellers.

Microsoft's decision to put its marketing muscle directly behind LAN Manager is viewed as crucial if the product is to compete successfully with Novell, Inc.'s NetWare, which commands 60% of the network operating system market today. LAN Manager has only been available through OEMs to date.

"By selling its own version of LAN Manager, Microsoft is giving users freedom of choice," said Craig Burton, executive publisher of the *Clarke Burton Report,* a monthly research magazine. "Users will no longer be constrained to buying versions of the product that only work with a particular OEM's hardware. This will help accelerate the acceptance of LAN Manager."

Jonathan Yarmis, vice-president of the personal computer service at Gartner Group, Inc. in Stamford, Conn., agreed. "The move solidifies and stabilizes the LAN Manager camp and will spur application development.

"Microsoft and its OEMs have to present a unified front, especially in light of Novell's merger

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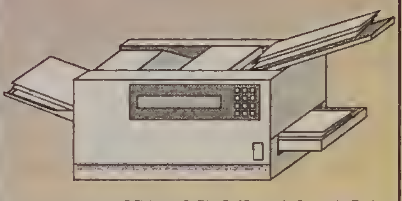
Fax facts

Average:	
Number of users per fax machine	10 to 50
Number of pages transmitted per day	15
Cost per page of transmission	35 cents
Cost per sheet of paper	5 cents
Cost of a fax machine	$1,500



GRAPHIC BY SUSAN J. CHAMPENEY

Net execs try to tame fax monster

By Tom Smith
New Products Editor

The explosive growth of facsimile machines has created a costly monster of which few companies are aware, let alone able to control.

Most large companies don't even know how many fax machines they have or how much they are spending on dial-up fax transmissions.

"It's like trying to manage envelopes or pieces of paper," said Bob Craig, vice-president of international network planning for The Chase Manhattan Bank, N.A. in New York. "People don't think it's worth the cost of managing it."

Yet the costs can be staggering. Annual transmission costs can be in the tens of millions of

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NETLINE

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AT&T TRIDOM plans to trial a pan-European VSAT network with two users. Page 2.

A TARIFF 15 USER is the loser in a heated battle between MCI and AT&T. Page 2.

VENDORS AIMING for FDDI interoperability form a testing consortium. Page 2.

3COM ELECTS Benhamou to the post of president. Page 4.

AMEX AWARDS MCI with a service contract that could be worth up to $100m. Page 4.

US SPRINT EXTENDS VPN services into international markets. Page 4.

PRIVATIZING TELECOM in Eastern Europe is a question of capital. Page 43.

NEWSPAPER

FEATURE

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Telecom privatization will aid int'l users

By Norman Lerner
Special to Network World

Most countries — industrialized, developing, capitalist and socialist — are at some stage of restructuring their telecommunications systems in order to accommodate and take advantage of the great political and economic changes now sweeping the globe.

In many places, this restructuring is taking the form of privatization of formerly nationalized telecommunications systems. This important trend raises major questions for multinational users of telecommunications services, including: Where is this happening and why? How will it affect the way we do business? And what will be the long- and short-term effects on telecommunications services to and from these countries?

This article examines the trend toward privatization in

(continued on page 38)

AT&T Tridom plans to test European VSATs this year

Vendor partners with Mercury Communications to establish VSAT presence in hopes of open market.

By Barton Crockett
Senior Editor

MARIETTA, Ga. — AT&T Tridom said last week it will begin pilot-testing pan-European very small aperture terminal satellite networks with at least two users by the fourth quarter of this year.

The networks will share an earth station hub in London and will support AT&T Tridom VSAT dishes on customer premises. The company said it hopes to run the network to user sites in at least three countries, pending regulatory approval.

This would make the network one of the first pan-European VSAT nets ever constructed. Currently, interactive VSAT networks are banned in virtually every Western European country, and no international VSAT offerings exist on the continent.

Due to recent moves to relax VSAT restrictions across the continent, however, AT&T Tridom believes it will be able to offer pan-European VSAT services commercially within the next year or two, according to Don Kennedy, European business development director with the

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Long-distance tariff wars take toll on unwitting user

Two carrier bids fall by wayside, stranding user.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — AT&T and MCI Communications Corp.'s continual battle over off-tariff network deals has wounded at least one customer, Resort Condominiums International (RCI).

What started as a bidding war for a two-million-minutes-per-month voice service account has left RCI enduring the fallout of two giants struggling to prevail in a legal battle at the Federal Communications Commission.

RCI, an Indianapolis-based vacation time-share company, had wanted to finalize a new telecommunications contract last October. MCI made a below-tariff offer, according to RCI, and AT&T offered a discounted deal under Tariff 15.

According to numbers in AT&T's Tariff 15 filing and corroborated by RCI, MCI offered RCI a deal providing 8% discounts below its tariffed rate for its Vnet virtual private network service and 10% below its 800 service tariff. The term of the contract was three years.

RCI told AT&T it would accept the MCI bid if AT&T were unable to offer an alternative. AT&T matched MCI's percentages but said its offer was still slightly higher in absolute cost than MCI's. The AT&T offer was also

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Vendors team up to ensure interoperability of FDDI

By Bob Brown
Senior Editor

DURHAM, N.H. — A group of network equipment and chip vendors last week said they plan to form a consortium to test products based on the Fiber Distributed Data Interface standard to ensure that the offerings can work together on heterogeneous nets.

While compliance with the nearly completed FDDI standard should guarantee interoperability among different vendors' offerings, the FDDI Consortium hopes to erase users' concerns about whether "standards-based" products will work together.

Fifteen vendors, including the Apollo Division of Hewlett-Packard Co., Motorola, Inc., Prime Computer, Inc. and Sun Microsystems, Inc., attended the first meeting of the proposed consortium earlier this month.

Invitations to join the consortium were extended to about 50 vendors. Among those invited that have not responded are Digital Equipment Corp. and IBM, according to Barry Reinhold, manager of the University of New Hampshire (UNH) Interoperability Lab here, which will serve as an FDDI product testing ground.

Reinhold said he is in the midst of determining how to get users involved in the FDDI Consortium. While vendor participation will be public knowledge, sharing test results with users will be up to individual vendors.

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Briefs

Big Tariff 12 deal in the works. American Business Network (ABN) Limited Partnership, a multi-industry consortium of 65 large corporations, is expected to announce on Wednesday one of the largest AT&T Tariff 12 contracts ever. ABN has been negotiating with AT&T for the past several months.

According to Lawrence Nadell, president of M&SD Network Services, Inc., the negotiating arm and general partner of ABN, the partnership collectively would be the biggest Tariff 12 order handled by AT&T to date.

ABN partners include Dow Jones & Co., Inc., Ingersoll-Rand Co., McGraw-Hill, Inc. and Toys R Us, Inc.

Bush to renominate Barrett to FCC. President Bush last week said he intends to nominate Andrew Barrett for a full five-year term as a commissioner of the Federal Communications Commission beginning July 1, 1990. Barrett's one-year term expires at the end of June. An aide to the commissioner said Barrett will likely accept. Barrett's reappointment would still face approval by the Senate Commerce Committee.

A first for US Sprint. US Sprint Communications Co. last week announced that the Consumer Division of Matrixx Marketing, Inc., will become the carrier's first commercial Integrated Services Digital Network customer in an agreement worth $18 million over three years.

Matrixx, a Cincinnati Bell, Inc. company, is currently using a single Primary Rate Interface (PRI) line and could have 20 to 25 PRI lines within a year, according to Curtis Peterson, consumer division vice-president of MIS. The PRI lines are expected to support access to a virtual private network as well as Dial 1 WATS and UltraWATS.

DEC doings. Digital Equipment Corp. last week said it expects about 2,000 employees worldwide to leave the company under the voluntary severance program it initiated last October.

Under the provisions of the program, which ends July 1, DEC will give 40 weeks' pay to workers with up to two years of service and as much as 104 weeks' pay for those who've been with the company for 20 years. So far, about 4,500 DEC employees in the U.S. have been offered the severance package and 800 have accepted, according to a DEC spokesman.

US Sprint forges X.400 Internet ties. US Sprint Communications Co. last week announced that it has established a link between its SprintMail electronic mail service and Internet, the data network serving more than two million users in 35 countries, including domestic government agencies, universities and commercial research organizations.

The connection was achieved using SprintMail 400, the company's implementation of the X.400 E-mail standard.

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***Network World* wants you.** If you have a news tip, please contact us. We'd also like to hear about unusual network applications and how you're optimizing your networks for performance or savings. Contact Editor John Gallant at (800) 622-1108, ext. 426, or through MCI Mail at 390-4868.

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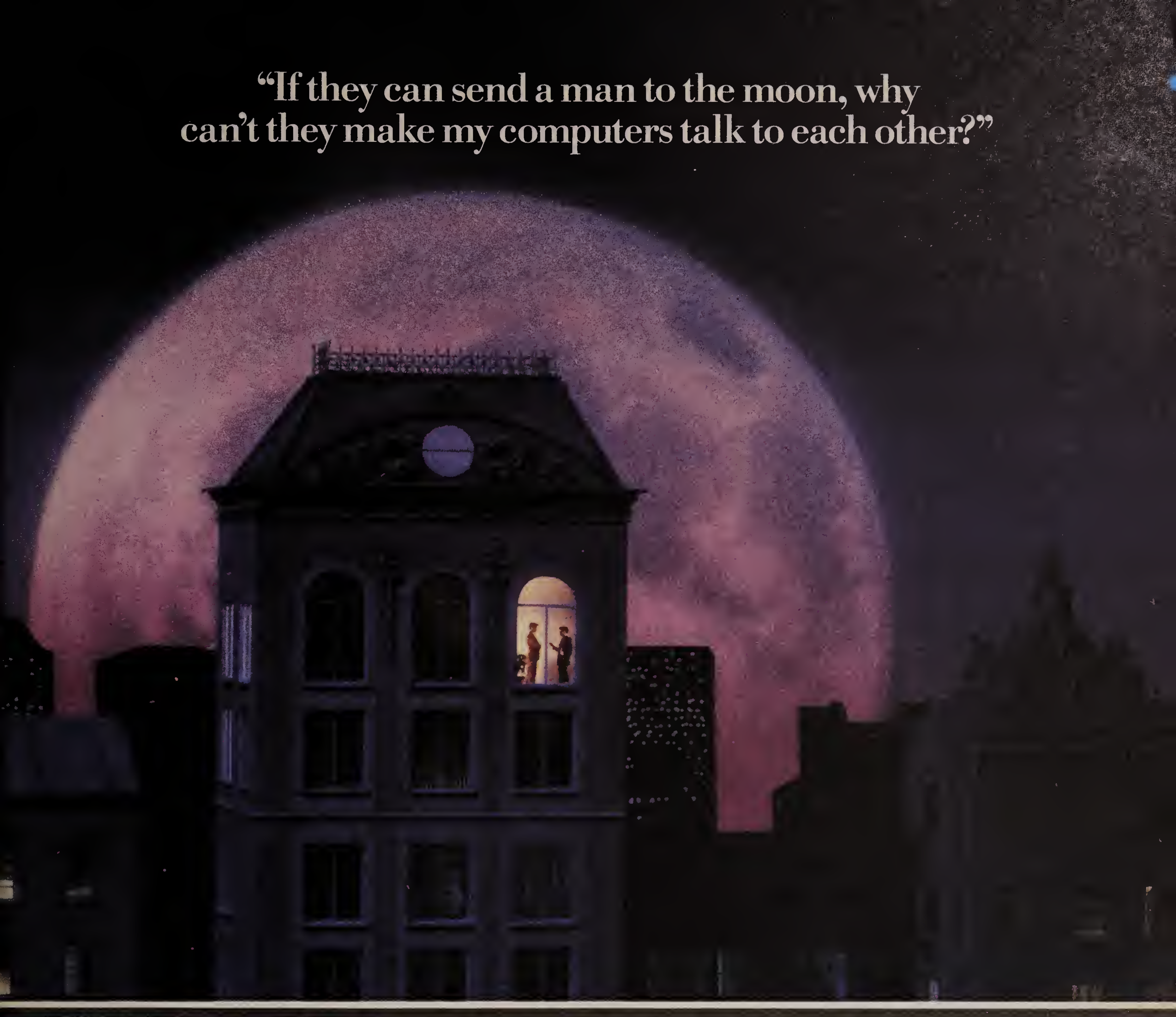
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3Com changes marketing direction under Benhamou

By Bob Brown
Senior Editor

SANTA CLARA, Calif. — Less than four months after creating a three-man executive committee to oversee operations, 3Com Corp. last week elected Eric Benhamou president and chief operating officer (COO).

The appointment gives Benhamou the sole responsibility for day-to-day operations at the local-area network vendor and enables him to institute a plan he previously architected to refocus the company's marketing.

Under Chairman and Chief Executive Officer Bill Krause, 3Com heavily promoted computer equipment such as servers and workstations as the heart of the network. Benhamou's plan calls for the company to better integrate its core net equipment — adapters, internetwork bridges and routers, and software — into customer sites, regardless of the computing equipment used.

Most recently, Benhamou served as executive vice-president of product operations on 3Com's Executive Committee, a three-member unit that was formed in January as part of a plan designed to identify a new president and COO.

Benhamou will report to Krause, who will focus on long-range planning. "The group of three was doing an excellent job, but it's hard to have three bosses," said Krause, who previously held the title of president. "Now there is one person who's responsible for providing clear and focused leadership."

Krause explained that a swift decision was made because it was time to implement the company's revised corporate strategy. Also, a quick decision didn't allow for disruptive political camps to form within the company, he said.

Analysts, who praised 3Com for its choice of Benhamou, said the timing is right in that 3Com has shown signs of a financial comeback and needs focused leadership to keep that momentum in the face of Novell, Inc.'s planned merger with Lotus Development Corp.

Benhamou said his major chore is getting 3Com back to its core products, such as Ethernet adapter boards, and selling them as part of network systems that might also include the company's internetworking products.

"The fundamental focus of the company is on the networking side of the spectrum as opposed to the computer side," Benhamou said. "We're seeing to it that all of our products are highly integrated amongst themselves, as well as interoperable with key

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US Sprint's international virtual private net bows

Service will initially serve the U.K., Hong Kong.

By Barton Crockett
Senior Editor

RESTON, Va. — US Sprint Communications Co. last week unveiled its Global Virtual Private Network (GVPN) offering, a service that extends the carrier's domestic VPN service into the U.K. and Hong Kong.

Users with dedicated access to US Sprint and Cable & Wireless PLC points of presence in the U.S., U.K. and Hong Kong will be able to use the service to support VPN features such as switched 56K and 64K bit/sec services and custom dialing plans to those countries.

GVPN, scheduled to be available in September, will be the most extensive international virtual net service ever offered ("US Sprint to unveil int'l VPN service at ICA show," *NW,* April 2).

Users say GVPN will be attractive because it will reduce international costs by providing bandwidth on demand and enable them to extend private network-like features to far-flung company sites.

"We've got several dedicated circuits for traders that are only used for a limited period of time each month," said Robert Maire, project manager with the New York-based investment firm Morgan Stanley. "Being able to pay on a time-sensitive basis for this bandwidth could be a big cost savings for us."

Cable and Wireless will offer the service through its carrier subsidiaries, London-based Mercury Communications, Ltd. and the Hong Kong Telephone Co.

Andrew Burroughs, vice-president for overseas marketing with Sprint International, based here, said pricing details for GVPN have yet to be finalized.

He did say, however, that GVPN will not be more expensive than US Sprint's Ultrawatts offering, which gives users with dedicated access to the carrier's network 15% to 20% discounts over standard US Sprint international long-distance rates.

Users will be able to use GVPN to support international seven-digit dialing plans, call forwarding, call waiting and automatic redial. Users also will be able to send data at 56K or 64K bit/sec over the network simply by pressing the pound key on their telephone along with a preset code.

Burroughs said that by the fourth quarter of this year, US Sprint and Cable & Wireless will begin rolling out integrated billing features that will enable the carriers to offer users a single bill for all GVPN services in the currency of their choice.

The carriers will also work to deploy an integrated network management service that will enable customers to change access codes, monitor traffic statistics and file trouble reports from ter-

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MCI secures 3-year, $60m Amex service agreement

Amex: AT&T's credit/phone card not a factor.

By Ellen Messmer
Washington Correspondent

NEW YORK — American Express Co. has awarded MCI Communications Corp. a $60 million, three-year service contract with an option for two additional years that could drive the total value of the contract up to $100 million.

MCI will provide American Express with its Vnet virtual private network service, as well as 800, international switched voice and electronic mail services, and domestic and international private data lines.

Under the agreement, MCI will serve all five of the American Express operating units: American Express Travel Related Services Co., Inc., American Express Information Services Co., American Express Bank, Shearson Lehman Hutton, Inc. and IDS Financial Corp. American Express operates in 120 countries worldwide.

Joe Stewart, senior vice-president of telecommunications with First Data Resources, Inc., part of American Express Information Services, said MCI was picked because it came in with "the proper mix — a combination of performance, reliability and pricing."

Stewart declined to discuss other aspects of the bidding situation, but he did say that AT&T's recent announcement of a consumer credit card was not a factor in the decision. American Express also has a Tariff 12 agreement with AT&T worth about $45 million annually.

American Express has historically made an effort to balance its telecommunications needs among multiple suppliers, Stewart said. "American Express — in particular, First Data Resources — uses multiple vendors in all its technical areas," he said. "Network operations are critical to our products."

First Data Resources processes more than a billion credit card transactions every year. The company offers authorization and billing services for its parent company as well as banks that issue other credit cards.

For both switched voice and data networking, the company is ensuring itself against liability "so that no single incident [can put us] out of business," Stewart said. "It's not a matter of if it's going to fail. It's a matter of when it's going to fail." ◼

Test site uses DEC Internet Portal for TCP/IP routing

By Jim Brown
Senior Editor

HOBOKEN, N.J. — Stevens Institute of Technology, a beta test site for Digital Equipment Corp.'s Internet Portal, is using the product to enable a wide-area DECnet link to support connections between TCP/IP devices on remote Ethernets.

Adding support for the Transmission Control Protocol/Internet Protocol to the DECnet link expands the number of devices researchers can access over the wide-area net and enables that circuit to back up an existing TCP/IP link.

"We essentially have two highways coming out of the campus," said Leslie Maltz, director of computing and communications resources. "The Internet Portal has opened up a wider road on one of those highways."

The college was a beta test site for the Internet Portal, software

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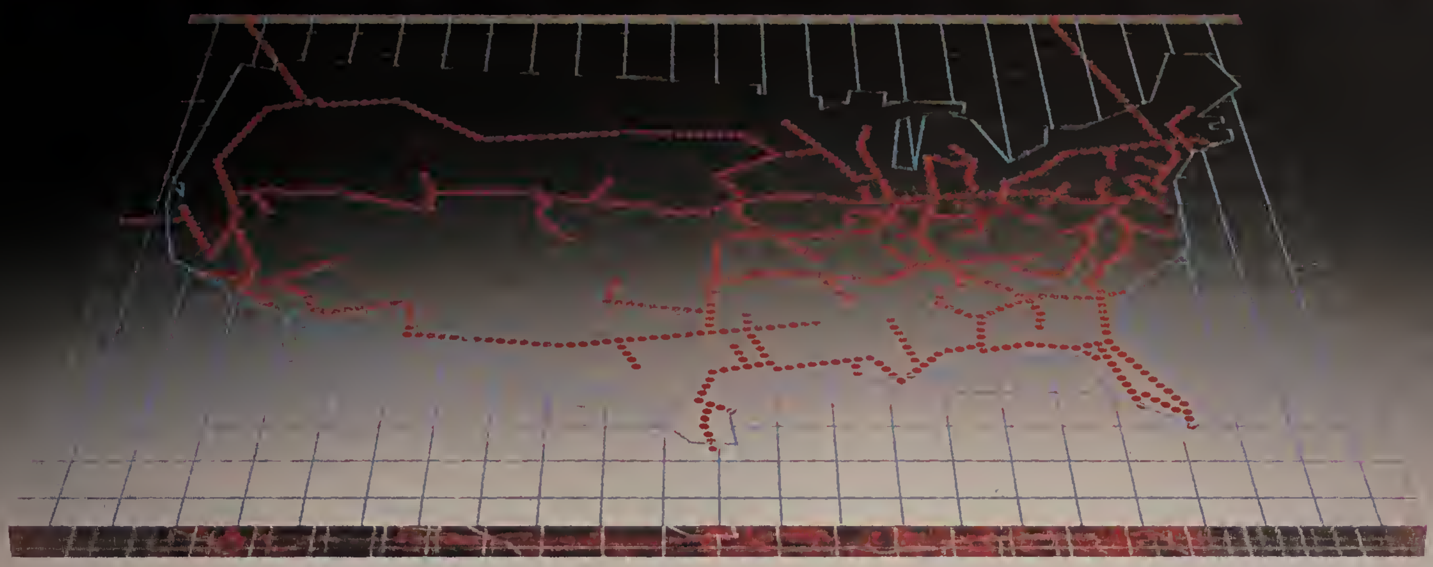

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Microsoft to market LAN Mgr.

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with Lotus [Development Corp.]," he said. "If there are 40 different OEMs going against Novell/Lotus, NetWare wins. If it's Microsoft and 40 LAN Manager OEMs going against Novell/Lotus, the two camps would divide the market."

Net Specialist Program

The new sales policy is embodied in Microsoft's Network Specialist Program, which will kick off this summer when the vendor introduces Version 2.0 of LAN Manager, according to Mike Murray, general manager of Microsoft's network business unit.

Microsoft will initially sell LAN Manager through about 600 select Compaq North American resellers, Murray said. Microsoft decided to team up with Compaq resellers because there are about 3,000 of them worldwide. Microsoft eventually plans to add other resellers as well, Murray said.

The Compaq resellers were also a logical starting point because the two companies had been working closely since last fall, when Compaq announced it would manufacture an OEM version of LAN Manager optimized to run on its new SystemPro server.

"We decided it made more sense to support LAN Manager this way, rather than continue with our efforts to market the product as an OEM under the Compaq brand name," said Michael Swavely, Compaq's director of North American Operations. "Offering LAN Manager 2.0 to our dealer channels will help achieve a single industry-standard version of LAN Manager."

Although Murray declined to divulge pricing or specifications for the product the firm would distribute, he said there is no truth in speculation that Microsoft's shrink-wrapped LAN Manager offering would be a barebones version of the product.

Just rumors

"All the rumors that we'll be offering a scaled-down version with our direct label products are just that — rumors," Murray said. "We are not differentiating between our own labeled product and our OEMs' offerings. All versions of LAN Manager 2.0 will incorporate the same base code."

Murray also said the Network Specialist Program will complement, not conflict with, existing agreements with its approximately 40 LAN Manager OEMs, although analysts said some conflict is inevitable.

"We've carefully designed the program to avoid channel conflict with OEMs," Murray said. "With the exception of 3Com [Corp.] and Ungermann-Bass, [Inc.], most of our OEMs focus on direct sales rather than reselling. So this just gives us more opportunity to push LAN Manager in the marketplace."

Microsoft's decision to sell its own version of the OS/2-based network operating system has been anticipated since last summer. Analysts say Microsoft must deliver its own version of the product in order to spur lackluster LAN Manager sales and also to encourage software developers to write applications for the product.

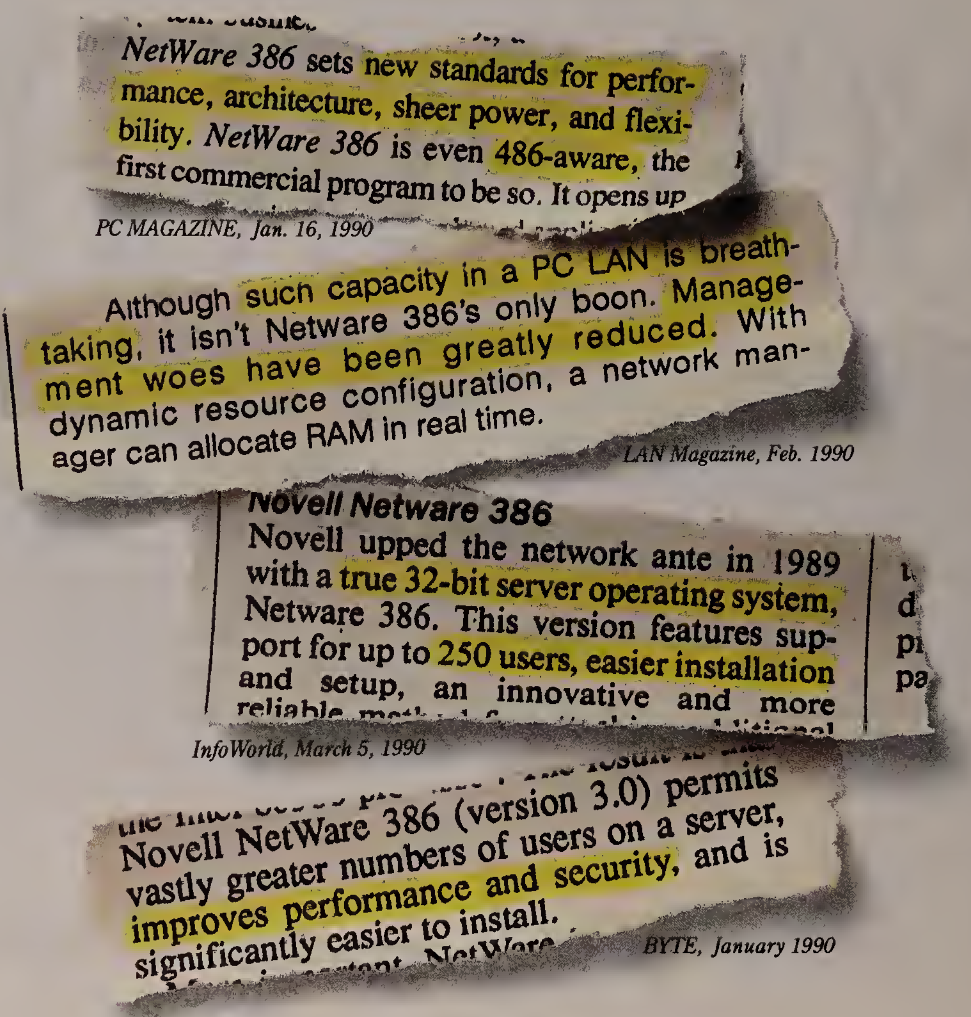
While there are no firm numbers on how many copies of LAN Manager have been sold by OEMs to date, International Data Corp. (IDC), a market research firm in Framingham, Mass., estimated that LAN Manager has 5% to 7% of the installed base after two years on the market.

"It's something that had to be done to kick start LAN Manager sales in the reseller channel," said Gartner Group's Yarmis. "Clearly, the sales by Microsoft's OEMs haven't done the trick."

Positive sign

Nancy McSharry, an analyst with the PC software program at IDC, concurred, saying Microsoft's decision to sell a shrink-wrapped version of the product sends a positive signal to users.

"To midsize and large corporate users, it indicates that Microsoft is making a much more thoughtful commitment to client/server computing," McSharry said. "They're not just saying, 'Buy LAN Manager from the hardware vendors and see you later.' Microsoft is putting its money where its mouth is and supporting the product." ◘



NetWare 386 sets new standards for performance, architecture, sheer power, and flexibility. *NetWare 386* is even 486-aware, the first commercial program to be so. It opens up

PC MAGAZINE, Jan. 16, 1990

Although such capacity in a PC LAN is breathtaking, it isn't Netware 386's only boon. Management woes have been greatly reduced. With dynamic resource configuration, a network manager can allocate RAM in real time.

LAN Magazine, Feb. 1990

Novell Netware 386

Novell upped the network ante in 1989 with a true 32-bit server operating system, Netware 386. This version features support for up to 250 users, easier installation and setup, an innovative and more

InfoWorld, March 5, 1990

Novell NetWare 386 (version 3.0) permits vastly greater numbers of users on a server, improves performance and security, and is significantly easier to install.

BYTE, January 1990

After everything that's been said about NetWare® 386,

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US Sprint's int'l virtual net bows

continued from page 4

minals or personal computers on their premises linked via dedicated lines to the carriers' network operations center.

Burroughs said all of these features are expected to be available by the end of 1991.

GVPN will be demonstrated for the first time at the International Communications Association's annual conference later this month in New Orleans. Beta tests will begin in July.

Most GVPN traffic will be carried over fiber-optic cables, including multiple undersea cables linking Asia, Europe and the U.S. The services will be supported by custom software that US Sprint and Cable & Wireless designed with Northern Telecom, Inc. for DMS-250 central office switches, which comprise the bulk of each carrier's public network.

By the end of this year, Burroughs said, two other carriers in North America, three in Asia and as many as four carriers in Europe will announce their intention to support GVPN services domestically and internationally. These services will then be introduced over the next year or two.

No foreign carrier currently offers virtual network services.

The only other U.S. carrier with an international virtual net is AT&T. This service, Global Software-Defined Network (SDN), extends domestic SDN features to London. MCI Communications Corp. plans to unveil a similar service for Vnet subscribers in the fourth quarter.

3Com changes under Benhamou

continued from page 4

third-party vendors' products."

Benhamou's promotion is the first step in the execution of the company's "Renaissance Plan," which has been in the works for about 18 months. The far-reaching program is the framework within which 3Com is refocusing its corporate and product direction, Krause said.

That program was planned alongside 3Com's efforts to streamline management, a program that included the creation of 3Com's Executive Committee. Benhamou served on that committee as executive vice-president of product operations with Leslie Denend, executive vice-president of corporate operations, and Bob Finocchio, executive vice-president of field operations.

3Com's Eric Benhamou

Benhamou said the Executive Committee will remain intact and serve as his operations staff. Benhamou's responsibilities as a member of the committee will be inherited by Denend. Denend's tasks as head of corporate operations will be shared by Benhamou and Krause.

Chris Paisley, vice-president of finance and chief financial officer, will round out the three-member Executive Committee, Benhamou added.

Analysts applauded Benhamou's promotion. "Benhamou has demonstrated that he has been a strong technologist and a good manager while at 3Com," said Rick Kimball, a general partner at Montgomery Securities in San Francisco.

The move was a smart one, according to Alice Bradie, a principal who follows the communications technology market at the investment firm of Hambrecht & Quist, Inc. in New York.

"Leaving three guys in a race for the gold might have created some political problems down the road. Also, with all the speculation [about 3Com being acquired or making an acquisition], that made it more urgent for 3Com to answer the question [about its leadership] and put the structure in place."

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1989 Product of the Year

LAN Magazine
1989 Product of the Year

BYTE
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PC MAGAZINE
1989 Technical Excellence Award

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you should be seeing red.

Net execs try to tame fax monster

continued from page 1

dollars for a Fortune 500 company.

Recognizing this, some users have attempted to take control of faxes by integrating intracompany fax traffic into corporate backbones.

Some products also enable users to transmit intercompany traffic over their nets, although they require end users to know the network configuration.

The fax problem stems from the fact that, like the early personal computer, fax machines were snuck in the backdoor. Virtually any department can afford a $1,500 fax machine, and few companies know how many machines they have.

As a rule of thumb, analysts say companies typically have one machine for every 10 to 50 employees. But not all employees are fax users. For example, of General Electric Co.'s 290,000 employees, only a third are likely to use faxes, according to Jerome King, manager of telecommunications technology for GE's Corporate Information Technology organization.

Operating costs are also hard to gauge. Don Ryan, vice-president at BIS CAP International, a research firm in Norwell, Mass., said it costs the average user $6 per day to run a machine. That figure assumes the device transmits 15 pages per weekday. A single machine, then, costs $120 per month to operate, or $1,440 per year.

But fax volumes vary widely. *Network World,* for example, spends an average of $20 per day on each of its two fax machines. That translates into $400 per month per machine, or nearly $10,000 per year for both machines.

When you consider that many Fortune 500 companies have hundreds or even thousands of fax machines, the numbers begin to multiply rapidly. GE, for example, has at least 3,000, and maybe as many as 8,000, machines in its 1,000-plus sites worldwide, King said.

If 3,000 fax machines transmit 15 pages per day over the public net, total fax costs for transmission alone — based on the parameters above — would be $4.32 million per year. If those machines transmitted 50 pages per day, which is *Network World's* average, costs would reach $14.4 million per year.

Some large companies, including GE, have taken measures to control fax costs. GE transmits fax documents over a virtual voice network.

"On an equivalent call, we think we save in excess of 20% compared to public network costs," King said.

Still other users, such as Fulton Prebon (U.S.A.), Inc., are trying to integrate fax traffic into existing private nets.

Within a month, Fulton Prebon plans to begin using a fax interface on its Republic Telcom Systems, Inc. multiplexers to transmit faxes between company locations in New York and London, according to Gerard Colliton, vice-president of communications for the international currency broker in New York. The multiplexers transmit a digital fax signal at 9.6K bit/sec and are expected to save 40% over the MCI Communications Corp. MCI Fax service the company currently uses.

The backbone option

In fact, integrating fax traffic into the corporate backbone may be the ultimate way to control fax costs because it would centralize control and treat fax like all other corporate data traffic. That goal, however, is complicated by the fact that not all fax traffic is intracompany. Much of it goes to locations not served by the backbone.

Ideally, then, companies need to be able to have their networks route fax traffic internally or to the node closest to an off-net destination and dump it into the local exchange as a fax call.

Fax machines from several vendors support such capabilities. Pitney Bowes, Inc., for example, offers a machine with one port for a leased line and another port for a dial-up telephone line, as well as storage for incoming faxes that need to be retransmitted, according to Paul Levitsky, manager of marketing programs for Pitney Bowes Facsimile Systems, a Stratford, Conn., division of Pitney Bowes.

Private to public

The private net-to-public net relay is also supported by a class of local-area network fax server products that operate under electronic mail systems. They enable users to designate a fax machine as an E-mail recipient.

Fax products from Alcom, Inc. and GammaLink, Inc. can be used in such an application. These products enable workstation users to send an E-mail message to a remote location and have it forwarded as a fax over the public network, according to Hugh Mackworth, vice-president of marketing for GammaLink.

Like the Pitney Bowes fax machine, this option still requires work on the users' part. Users must determine the node closest to the recipient and provide addresses for that node and the off-net recipient.

Ultimately, however, the E-mail/fax server combination should make it possible for users to call up an E-mail menu, select fax from a number of delivery options and simply enter the destination telephone number. The network would determine if the destination was an off-net location and forward it accordingly.

In addition to saving on transmission costs, this configuration would improve worker productivity by allowing workstation users to create and send faxes from their desks and reduce the number of fax machines required. But some conventional machines would still be required to send and receive documents that cannot be created or displayed on simple terminal or personal computer screens. ☒

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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

"I wouldn't be surprised to see [United Telecommunications, Inc.] sell off its local telephone business some day. I don't think this will happen right away, but United Telecom is at the point where its US Sprint long-distance business is much larger than its original local phone business."

John Bain
Telecommunications analyst
Raymond James & Associates, Inc.
St. Petersburg, Fla.

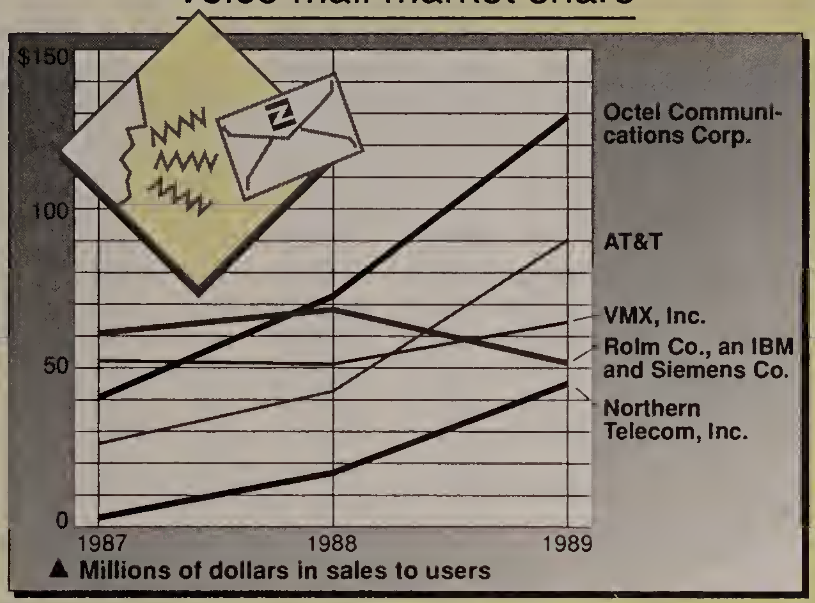
People & Positions

Pat Howard has been appointed president and chief executive officer of **VMX, Inc.**, a San Jose, Calif.-based manufacturer of call processing and voice-messaging systems. Howard, who had been president and chief operating officer, replaces **Jack McKittrick,** who announced his retirement earlier this year.

Infonet Services Corp. last week said it named **James Heerwagen** to the newly created position of manager of product marketing for network services. Heerwagen will spearhead Infonet's drive into systems integration by promoting Infonet's public and private network offerings and Enterprise Defined Network Services.

Fox Software, Inc. last week announced the appointment of **Walter Kennamer** as executive vice-president and chief operating officer.

Kennamer will have responsibility for all company operations except engineering and quality assurance. Kennamer was a partner in the national office of the consulting firm of Ernst & Young prior to joining Fox Software.


Voice mail market share

GRAPHIC BY SUSAN J. CHAMPENEY SOURCE: VANGUARD COMMUNICATIONS CORP., MORRIS PLAINS, N.J.

Rolm tries to regain voice mail foothold

Firm will expand PhoneMail to run on other PBXs, exploit Siemens ties to enter European market.

By Bob Brown
Senior Editor

NORWALK, Conn. — Rolm Co., once the voice mail industry's leader, is trying to address shortcomings in its strategy in an effort to make a comeback and regain its mid-1980s form.

Rolm, a joint venture of IBM and Siemens AG, has dropped from first to fourth place in the voice mail market since 1987. It is now taking a cue from competitors by upgrading its PhoneMail product line to run on other vendors' private branch exchanges and by developing a stable of vertical market applications.

Rolm is also banking on its family ties to Siemens — the global network equipment vendor that acquired Rolm last year — to help the struggling PBX company expand into Europe.

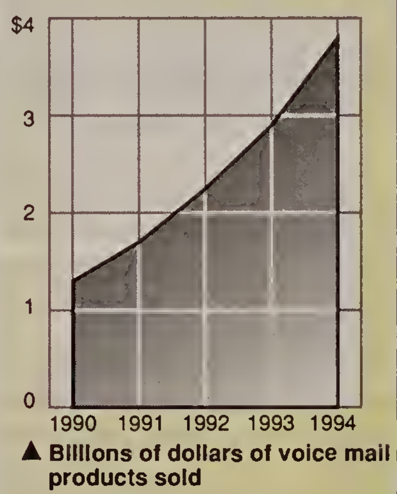
This relationship should end user speculation about Rolm's future, as Siemens has made it clear that Rolm will be an integral component of its business. While a division of IBM, Rolm lost tens of millions of dollars annually as customers cut back on or delayed purchases because they doubted IBM's commitment to the market.

Rolm now consists of two related organizations as a result of an agreement last year between IBM and Siemens: Rolm Systems, Inc. manufactures Rolm PBX and voice mail products and is owned by Siemens; Rolm Co. is the marketing, sales, installation and service venture owned by IBM and Siemens.

Among the companies blocking Rolm's path is market leader Octel Communications Corp., a Milpitas, Calif.-based voice-processing equipment firm that has succeeded by enabling users to run the company's voice mail software on many vendors' switches.

In addition, AT&T and Northern Telecom, Inc., which compete with Rolm in the PBX market as well, have become forces in the market.

Total voice mail shipments



SOURCE: VENTURE DEVELOPMENT CORP., NATICK, MASS.
GRAPHIC BY SUSAN J. CHAMPENEY

Most industry observers agreed that Rolm can lure new customers, but it also must stave off raids by other vendors into its existing customer base.

"Rolm's reorganization [the Siemens deal] will provide the stability needed to get the company back to its roots as a lean and mean PBX manufacturer with an entrepreneurial spirit, but I don't know if Rolm can increase its voice mail market share," said Chris Seelbach, senior strategic analyst at Probe Research, Inc., a market research firm in Cedar Knolls, N.J.

(continued on page 10)

Novell execs contend with internal unrest over merger

Employees say tension mounting over job security.

By Laura DiDio
Senior Editor

SAN JOSE, Calif. — Although the proposed merger of Lotus Development Corp. and Novell, Inc. may look like a winner to outsiders, the rank and file within Novell have greeted the deal with fear and uncertainty.

While employee unrest is commonplace in any merger transaction, Novell has its hands full trying to assuage concerns about job security and strategic direction.

Novell executives maintain that the mood within the company is generally upbeat, but sources at the firm who asked not to be identified said last week they are upset about the lack of solid information on basic issues.

Sources said the absence of concrete facts has led to confusion and doubt within the company, especially at the San Jose and Sunnyvale, Calif., sites, where there are many former employees of Excelan, Inc. and Kinetics, Inc. Mergers at both of those companies were followed by extensive layoffs.

Employee complaints range from annoyance at the lack of specific information regarding the effects of the merger to anger that Novell personnel will not receive premiums for their stock.

"We should have gotten a premium for our stock," one Novell employee said. "Rumors are flying, and we're getting very little in the way of explanations about what the merger means to our jobs."

Employee frustration was even more evident following a round of routine weekly Novell "members meetings" at five Novell sites in California, Texas and Utah on April 13.

Novell's Kanwal Rekhi

At the San Jose meeting, hosted by Kanwal Rekhi, Novell's executive vice-president of product development, some employees became extremely tense following a verbal exchange between Rekhi and a Novell marketing manager who disagreed with Rekhi's assessment of the situation and asserted that he had lied to employees.

(continued on page 10)

INDUSTRY BRIEFS

Network Equipment Technologies, Inc. (NET) last week posted earnings of $13.5 million for its fiscal 1990 year, down almost 16% from the corresponding period a year ago.

In addition, the company was slapped with a class-action suit brought on behalf of shareholders who charged the company had violated securities laws in connection with public statements.

The company reported revenue of $181.3 million, compared with $136.7 million for the year before. NET also said it restated its earnings and revenue for its fiscal second and third quarters, which lowered results for those periods due to an internal investigation that uncovered "the reversal of one shipment, valued at approximately $519,000, that was made pursuant to an invalid order."

For the third fiscal quarter, $1.4 million was also deemed to be the result of shipments linked to the invalid order and $4 million "represented shipments now known to have been made without appropriate order documentation from customers," NET said.

Northern Telecom, Inc. last week reported first-quarter earnings of $74 million, for the period ended March 31, a 57% increase over last year's first-quarter earnings of $47 million. Northern Telecom reported revenue of $1.6 billion for the period, 14% higher than the corresponding quarter in 1989.

Novell forms alliances to sell NetWare line in Japan

By Bob Brown
Senior Editor

TOKYO — Novell, Inc. recently launched a joint venture here with Softbank Corp., a major Japanese software and peripheral distributor, to market and support Japanese versions of its NetWare local-area network operating system.

The venture, dubbed Novell K.K., was established by Novell, Softbank and five Japanese development partners: Canon, Inc., Fujitsu Corp., NEC Corp., Sony Corp. and Toshiba Corp.

Through the venture, NetWare will be adapted to run on computers sold by its Japanese development partners, which own about 85% of Japan's hardware market. It will feature screen displays and technical documentation translated into Japanese.

The first product from Novell K.K. will be Japanese NetWare 386, which is expected to be available this fall, said Ernst Gemassmer, Novell's senior vice-president for international operations.

By Novell's own estimates, Japan's fledgling LAN market will be half the size of the U.S. LAN market within five years. This growth in LAN usage is what makes Novell's entry into Japan interesting for U.S.-based communications managers running international nets that extend into the country, Novell said.

"Japanese business is ready for Novell's client/server network computing solutions," said Ray Noorda, Novell's president and chief executive officer. "Japan's office automation market is poised for growth as it moves toward decentralization of computing resources and becomes more concerned with interconnecting large numbers of dissimilar PCs and workstations."

Novell, which recently announced plans to merge with Lotus Development Corp., joins competitors Microsoft Corp., 3Com Corp. and Ungermann-Bass, Inc. in the Japanese LAN market.

Novell K.K. will offer local NetWare support through Certified NetWare Engineers on staff to support Japanese NetWare products, he said. Softbank's "familiarity with the unique needs of the Japanese computing market" will prove to be valuable to Provo, Utah-based Novell, Gemassmer added.

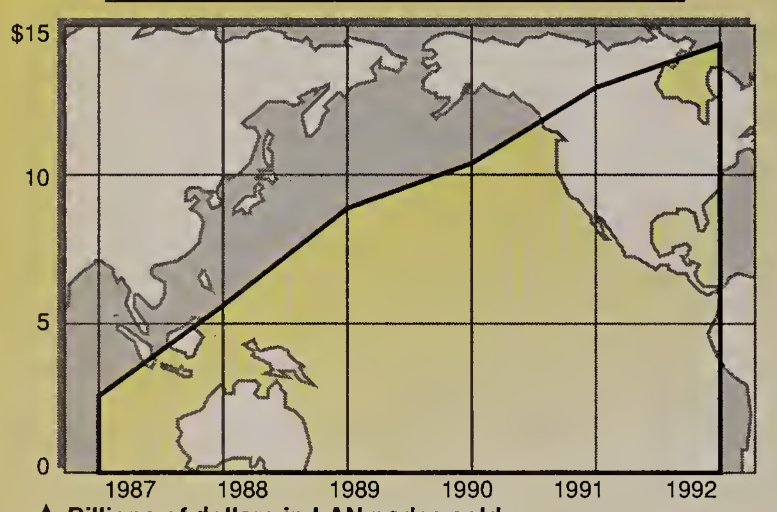
Through its support staff, Novell K.K. will sponsor the NetWare Consortium, a Japanese version of Novell's group founded to encourage development of NetWare applications and oversee users group meetings.

According to Dave Perro, an industry analyst at the San Jose, Calif.-based market research firm Dataquest, Inc., entering the Japanese marketplace for LANs makes sense for Novell. "Japan is still a couple of years behind the U.S. in its use of LANs, but that will change," he said.

Frank Michnoff, senior research analyst at the META Group, a Westport, Conn.-based market research firm, agreed.

"Look at the strong overseas sales being reported in the [computer and network] industry; Japan is a growing market," Michnoff said. "The companies that are successful will have to understand the Japanese market. Teaming up with a Japanese company is certainly one way to do that."

LAN market in the Pacific Rim



▲ Billions of dollars in LAN nodes sold

Pacific Rim includes Australia, China, Japan, Korea, Malaysia, Singapore, Taiwan and Thailand.

GRAPHIC BY SUSAN J. CHAMPENEY SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

Novell contends with unrest

continued from page 9

Rekhi responded by saying he wasn't a liar and would be happy to accept the manager's resignation if he didn't believe what he was being told.

"The reaction [following the exchange] was stunned silence and a few audible gasps. Many of us were shocked that a senior officer of the company would ask for someone's resignation in an open meeting. I hope this isn't a portent of things to come," said a Novell manager who attended the meeting.

Rekhi acknowledged that the confrontation occurred but asserted that, far from being tense and confused, the mood among Novell staffers is generally upbeat.

Rekhi admitted that he was unable to offer employees much detailed information to allay their concerns at this time because many details remain to be worked out.

Dave Atlas, a software analyst at International Data Corp. in Framingham, Mass., agreed that Novell executives haven't done a good job of allaying employee concerns, which are natural in any merger/acquisition situation.

"I don't doubt that Novell executives have handled the employee situation badly because everything is happening so fast and furious," Atlas said.

He added that even though Novell employees are worried about which jobs might get phased out, "I don't think Lotus will perpetrate any 'Texas Chain Saw Massacre.' It would be foolish to go in and start hacking things up."

Novell's Rekhi agreed and said that, unlike last year's Novell/Excelan merger, there are very few areas of overlap between Lotus and Novell that will ostensibly require large-scale layoffs.

Rekhi said Novell will continue to hold weekly merger forums at its sites to provide employees with information as it becomes available and to offer a forum for their comments and questions.

"We haven't addressed any product issues yet. But there will be no disruptions or changes in upcoming product rollouts or strategy," Rekhi said.

> "I don't think Lotus will perpetrate any 'Texas Chain Saw Massacre.' It would be foolish to go in and start hacking things up," IDG's Dave Atlas said.

▲▲▲

Rolm's decline in voice mail tied to fall in PBXs

NORWALK, Conn. — It is of no coincidence that Rolm Co.'s fall from its perch atop the voice mail market has been paralleled by its decline in the private branch exchange market, industry watchers said.

Rolm, a joint venture of IBM and Siemens AG, has dropped from first to fourth place in the voice mail market since 1987, and its PBX line shipments have fallen from 813,000 lines in 1987 (a 16.2% market share) to 633,000 lines in 1989 (a 12.8% market share), according to Eastern Research Corp., a market research firm in Parsippany, N.J.

"Rolm essentially utilized market share in the PBX arena to leverage the voice mail market," said Patrick Springer, director of telecommunications industry services at the consulting firm of Telecommunications Management Consultants in Needham Heights, Mass. "Falling PBX market share is telling."

AT&T and Northern Telecom, Inc., fellow competitors in both the voice mail and PBX market, have taken a different approach from that of Rolm, analysts said. AT&T and Northern Telecom have recognized the significance of having a good voice mail offering to help them sell switches, said Don Van Doren, president of Vanguard Communications Corp., a Morris Plains, N.J.-based firm.

Thanks to a sharp focus on selling voice mail, AT&T and Northern Telecom have increased their shares in this market greatly and faired decently in the PBX market as well. AT&T has risen from fourth to second place in the voice mail market, and Northern Telecom has jumped from 10th to fifth, according to Vanguard Communications' research.

"AT&T and Northern use voice mail as a differentiator" of their switch capabilities from other suppliers, Van Doren said.

— *Bob Brown*

Rolm tries to regain foothold

continued from page 9

Rolm was the voice mail market leader as recently as 1987, when it held a 21% share, according to Vanguard Communications Corp., a consulting firm in Morris Plains, N.J. (see graphic, page 9). But a combination of increased competition and "market confusion" among customers unconvinced that IBM intended to keep Rolm led to a loss in market share. Rolm dropped to fourth place in 1989, with an 8% cut of the market, said Don Van Doren, Vanguard's president.

Deborah Tanaka-Laude, PhoneMail branch manager at Rolm, explained that market share figures for 1987 reflected a market dominated by customer premises voice mail equipment, while 1989 figures reflect a much larger proportion of service and central office-based voice mail equipment, which Rolm does not sell.

"One of the main reasons for Octel's success is its ability to integrate with so many vendors' PBXs," said Jerry King, manager of telecommunications technology at General Electric Co. in Bridgeport, Conn., which has about 100 Octel voice mail systems installed across a variety of vendors' PBXs.

This, in fact, has been "an area of focus for Rolm" since 1987, Tanaka-Laude said. In February, Rolm announced that PhoneMail can be used in conjunction with AT&T's 5ESS switch.

Previously, Rolm announced integration of PhoneMail with Northern Telecom's SL-1, SL-100 and DMS-100 switches, as well as other switches from AT&T and NEC Corp., she said.

Meanwhile, Octel has been beating Rolm at what was once its game — selling customized applications, said Patrick Springer, director of telecommunications industry services at Telecommunications Management Consultants, a consulting firm in Needham Heights, Mass.

"Octel has gone after vertical markets, such as higher education," Springer said. "Rolm, in a 180 degree reversal, seemed to lose its focus on the customer and its ability to develop applications. Rolm's latest version of PhoneMail is a 'me-too' product that puts Rolm back in the ranks of a contender, but that didn't leapfrog the offerings of the other major players."

Rolm's Release 4 of PhoneMail provides a platform for future applications development, said Tanaka-Laude, who noted that a leak about the product before its availability last summer contributed to some buying delays.

An opportunity that could help Rolm bounce back is the overseas voice mail market, which is bound to grow during the 1990s, said Paula Goodwin, an analyst at Market Intelligence Research Co., a research firm based in Mountain View, Calif.

Rolm executives said they recognize the potential voice mail market in Europe but have not made plans for that part of the world public.

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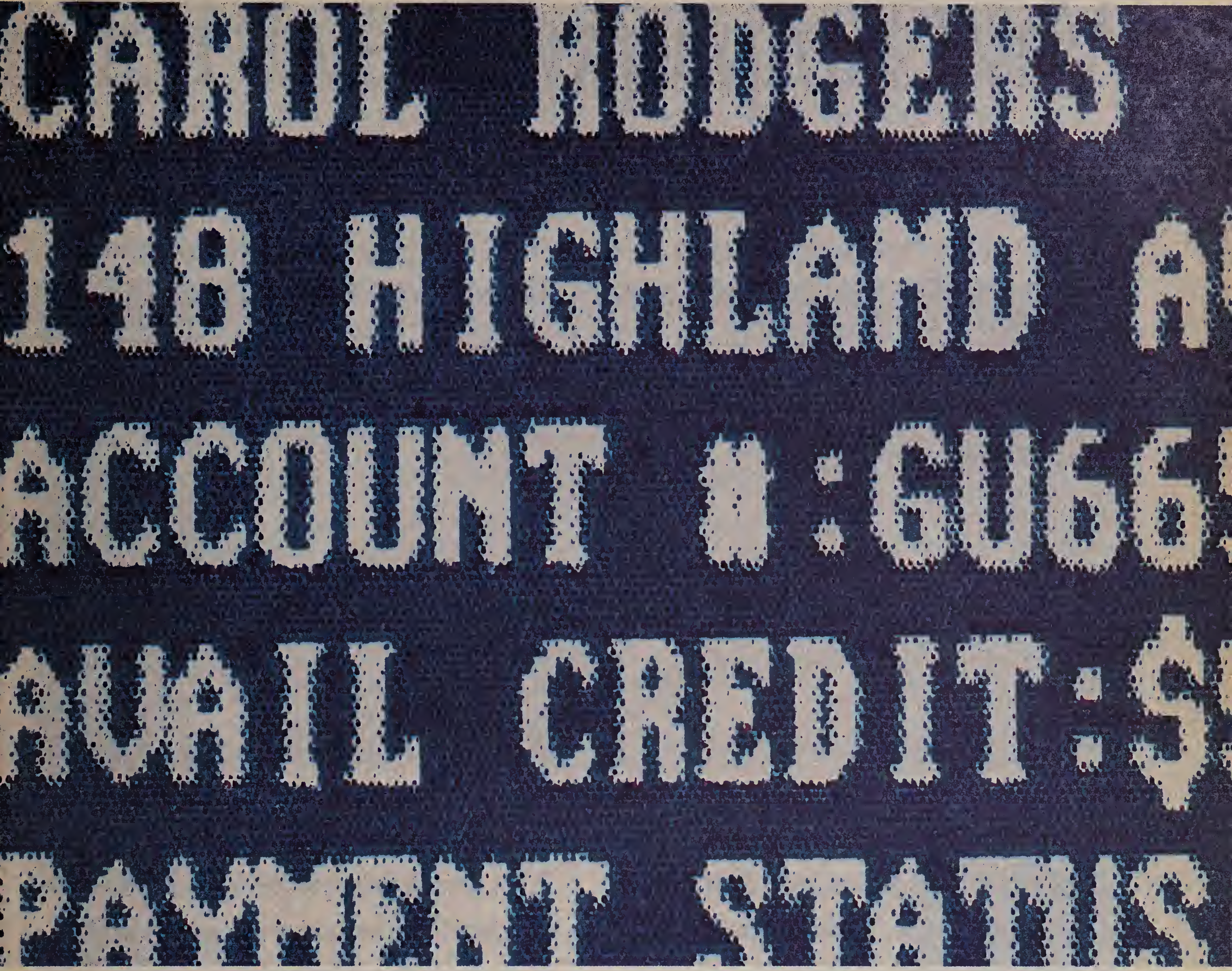

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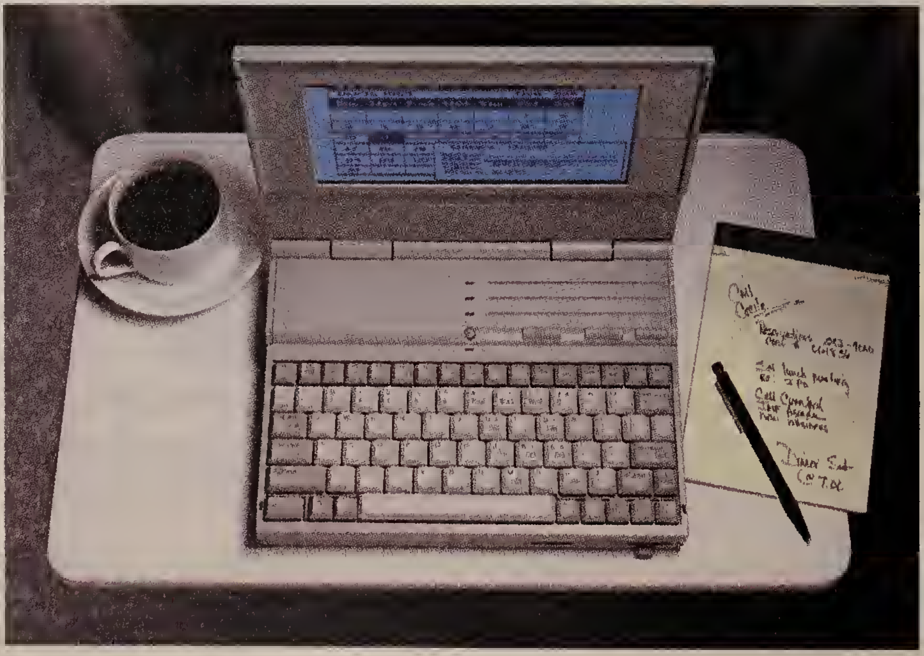

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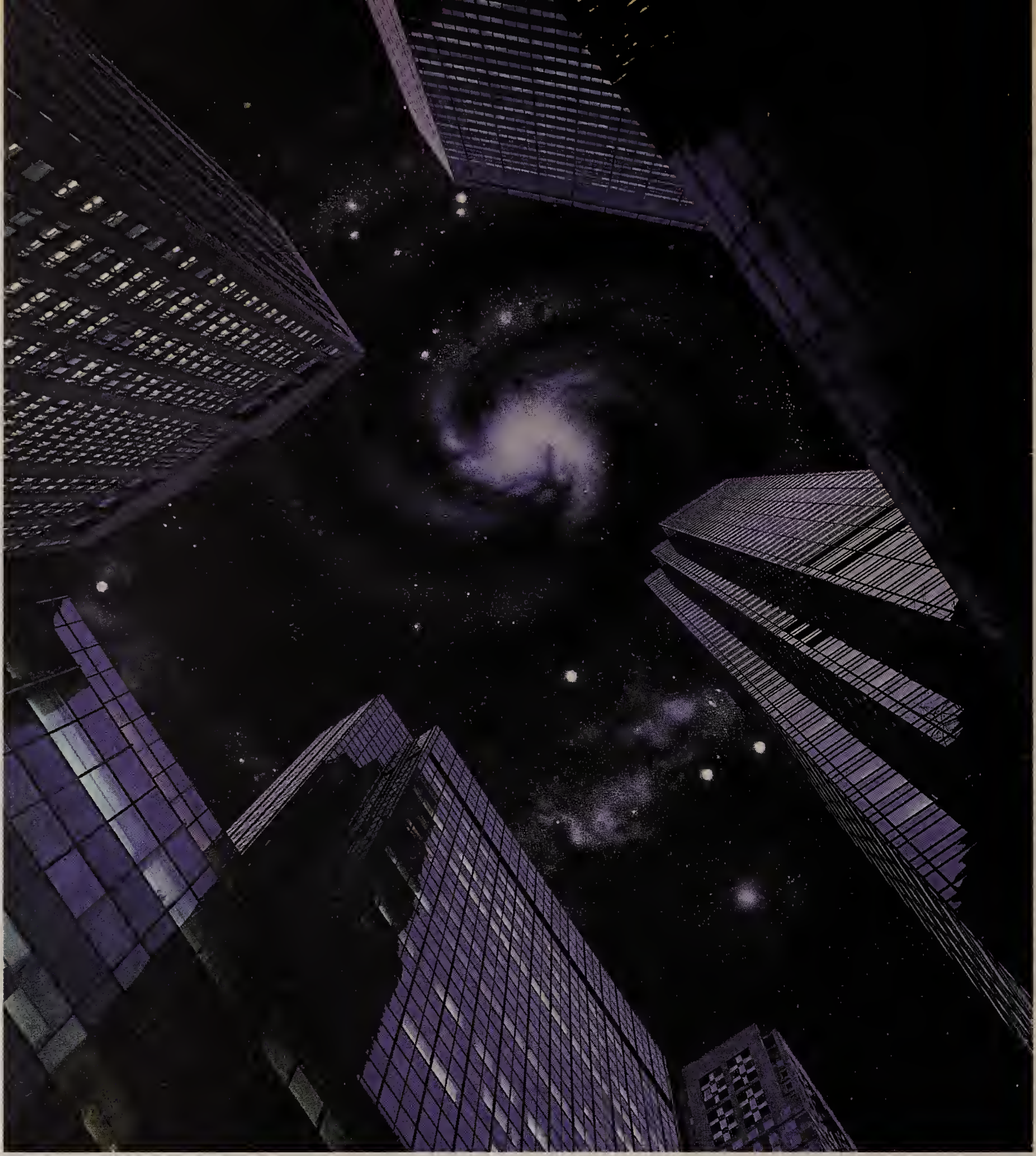

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Worth Noting

The number of cities with at least one alternative access carrier will increase from 17 in 1989 to 35 in 1991, according to a recent study by The Yankee Group, a Boston-based consultancy.

Carrier Watch

AT&T said that by May, a new pricing tool will be available to its Federal Telecommunications System (FTS) 2000 customers. The Service Analysis Tool, software that will reside on an AT&T 3B2/600 minicomputer, will let users of the AT&T portion of the government's FTS 2000 long-distance network estimate pricing for net services.

Users will have access to the AT&T data base from their workstations. Once they have keyed in information about where the service is to be installed, traffic patterns and calling volumes, the tool will estimate prices for a variety of access configurations. The most cost-effective solution should then be apparent, said Doyle Girouard, AT&T director of FTS 2000 marketing and sales.

The **Federal Communications Commission** recently allocated 4 MHz of the radio frequency spectrum for use with airplane-to-ground telephone services.

The success of GTE Corp.'s experimental "Airfone" trials with U.S. airlines spurred the FCC to establish a permanent allocation of spectrum for the service. Air-to-ground service will be regulated on an interstate basis. Services will be established on a common carrier basis, although waivers may be permitted for some services on a private carrier basis.

The FCC said it will only consider applicants that have a service agreement with at least one airline and commitments to construct at least 25 base stations.

CBS awards 3-year, $18m virtual net contract to MCI

Regulatory delays worked against AT&T's bid.

By Ellen Messmer
Washington Correspondent

WASHINGTON, D.C. — MCI Communications Corp. has won an $18 million three-year virtual private network contract with CBS, Inc., beating out competitors AT&T and US Sprint Communications Co.

Price was the main factor in selecting MCI, said James Halsey, CBS vice-president of the MIS division. MCI came in with the lowest bid.

AT&T, which bid for the CBS business under a Tariff 15 deal, said CBS revealed that MCI offered 21.9% discounts off its tariffed Vnet rates. Other inducements from MCI were delayed penalty applications, free D4 channel banks for each location using dedicated access and a commitment that the discounted rates would not increase over three years, AT&T claimed.

AT&T's Tariff 15 included a 23% discount for its Software-Defined Network service but did not include free or discounted D4 channel banks.

AT&T maintained that the total monthly usage charges for CBS would be $175,540 under the Tariff 15 offer and $169,850 under the MCI plan.

According to AT&T, tariffed rates for the same service would stand at $227,916 for AT&T and $217,545 for MCI.

Halsey and Tom Maile, vice-president of telecommunications at CBS, declined to discuss the contents of the Tariff 15 filing, but both said the regulatory factor was just one element in the decision to sign up with MCI.

Time of the essence

The fact that MCI could provide service immediately and AT&T had to wait for approval on its controversial Tariff 15 was an important consideration, they said. Price was the major factor, Maile said, but "we chose MCI because they can provide for us right now."

"Broadcasting is a very competitive business," Halsey said. "My job is to see that we get the best for our money."

Halsey expressed confidence in MCI's service and reliability, and noted that the contract award gives MCI the status of CBS' primary provider.

CBS had previously split its dial-up switched service evenly

(continued on page 16)

WASHINGTON UPDATE

BY ELLEN MESSMER

AT&T makes another attempt at Tariff 15. AT&T recently filed its fifth Tariff 15 Competitive Pricing Plan offer, this one for San Antonio,Texas-based La Quinta Motor Inns, Inc. The carrier is using Tariff 15, still in legal limbo at the Federal Communications Commission, as a tool to counter alleged below-tariff offers from competitors.

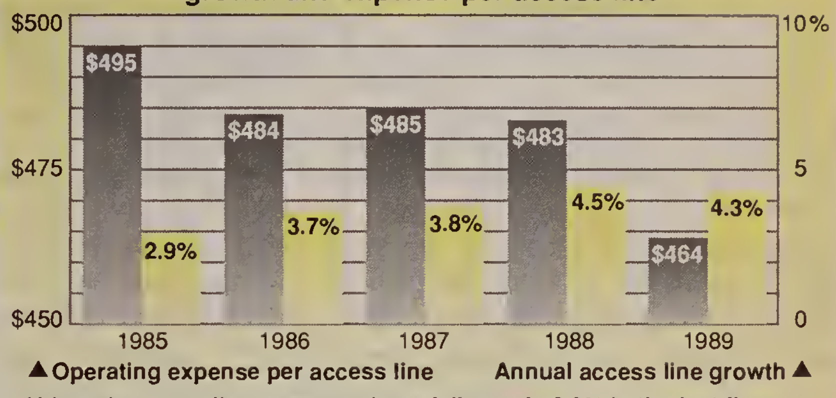
According to information that AT&T said was supplied by La Quinta management, MCI Communications Corp. in February offered the motel chain its virtual private network and 800 services at a flat rate of 9 cents per minute on a month-to-month basis with no term commitments. That represents a 31.1% discount below MCI's tariffed rates, AT&T said.

In its counteroffer under Tariff 15, AT&T offered La Quinta an average rate of 10.85 cents, which represents a 22% reduction of AT&T's interstate Software-Defined Network service rates. The tariffed rates for AT&T and MCI are listed at 13.89 cents and 13.07 cents, respectively, the AT&T filing said. AT&T's offer has a one-year term requirement.

IDCMA balks at AT&T deregulation. The Independent Data Communications Manufacturers Association, Inc. (IDCMA) said that several aspects of the Federal Communications Commission's recent proposal to lessen regulation of AT&T would seriously impair competition. IDCMA director Robert Stearns said, "The effects could be severe for the data communications equipment and computer services industries." The IDCMA objected to a FCC proposal to allow AT&T to bundle customer premises equipment with transmission services.

The falling cost of access

Pacific Bell and Nevada Bell access line growth and expense per access line



Although access line expenses have fallen only 6.2% in the last five years, each incremental decrease is multiplied by several million lines (for example, Pacific Bell has 13.5 million lines in service) resulting in huge savings.

GRAPHIC BY SUSAN SLATER

SOURCE: PACIFIC TELESIS GROUP, SAN FRANCISCO

Users demand more services, net control

Users and carriers disagree on solution, but conference-goers willing to work with carriers.

By Anita Taff
Washington Bureau Chief

ATLANTA — Users at the recent Supercomm '90 conference here said carriers are not providing all the services customers need, but users are willing to work more closely with carriers to speed the delivery of network business solutions.

During a panel discussion, representatives from two user companies and three carriers agreed that customers are demanding increasingly sophisticated services and more control over their networks. They disagreed, however, on the extent to which carriers have lived up to user expectations and how to proceed as partners in the future.

The rift between customer needs and available services is evident in the existence of private networks. As hard as carriers try to meet customer needs with switched net facilities, users are still building private nets.

Norman Sefton, director of communications at Duke University in Durham, N.C., said, "My business is education. I don't really want to be in the telephone business." But users have had to build their own networks "because they couldn't get the services that they desired at the time or at a price they thought was fair," he said.

"If there's a provider that can give services to me at the quality that I want at the price I think is fair, I'll get out of [the communications] business immediately," Sefton said.

Jim Sobczak, vice-president of sales and marketing at Westinghouse Communications Systems said he is skeptical about whether public switched networks will ever be able to serve all customer needs.

"As data networks become more and more vital to the day-to-day operations of the company, users by nature will want to have more control over those networks," Sobczak said. "Most users will view a public network solution as giving up some of that control."

Robert Alton, president of the telephone operations sector at Contel Services Corp., says carriers are trying to meet user needs, but he admits that there are signs they have not done the job.

The fact "that private networks exist [as] an alternative to the public switched networks says to me that the public switched network failed to meet the demands of customers," he said.

However, Franklin Skinner, president of Southern Bell Telephone and Telegraph Co., defended carriers' past efforts as adequate. He said his company tries to meet every customer need but is sometimes constrained by limited resources.

"Clearly, our customers are telling us they want more control of the network, they want more flexibility, and they also want minimal interaction with the telephone company," he said. "We have been working diligently with our customers, particularly our large customers, to define their needs and to plan network advances on that basis."

However, as much as Southern Bell wants to meet all customer needs, "there's always a question

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AT&T waives fees for ASDS, voice-grade lines

By Bob Wallace
Senior Editor

BASKING RIDGE, N.J. — AT&T recently filed a promotional program that waives or reduces a variety of onetime charges for its Accunet Spectrum of Digital Services (ASDS) and voice-grade private lines. If approved, the program would run until Aug. 25 and apply to users that plan to have the service installed by Feb. 25, 1991.

For the fractional T-1 ASDS, AT&T will waive the installation and access coordination charges for lines used to access the service. The carrier will also issue onetime service credits that vary depending on the type of access used. AT&T will credit users' monthly ASDS bill $1,310 for each T-1 access channel ordered and $196 for each digital access link installed.

ASDS enables users to buy bandwidth on a carrier-supported T-1 line in 64K bit/sec bundles, each of which costs less than a comparable 56K bit/sec Dataphone Digital Service line.

ASDS services support digital transmission at speeds of 56K, 64K, 128K, 256K, 512K and 768K bit/sec. In addition to cost savings, fractional T-1 services offer users new backbone configuration options that will increase network reliability.

The company is offering a similar promotion for voice-grade lines in the anticipation that these users will ultimately become ASDS customers, a company spokesman said. AT&T will waive the installation and access coordination charges on local access lines for voice-grade private lines and issue $196 credits for each analog access channel ordered.

The promotion also covers AT&T's Financial Communications Arrangement (FCA), a ring-down service between New York and Chicago that establishes a point-to-point link when callers pick up their telephone. No dialing is required.

AT&T said it would waive the onetime $800 charge for each FCA line installed during the promotional period.

Users demand more services, net control

continued from page 15

of whether that customer need can be met on an economic and timely basis," Skinner said.

Dave Dorman, president of the national accounts division at US Sprint Communications Co., said he believes carriers have been responsive to user needs. "The customer is driving my company to make investments that it wouldn't have made on its own accord except to solve a specific customer problem," Dorman said.

Carriers are dependent on users to tell them what network applications they need, he said. US Sprint welcomes any opportunity to partner with customers to develop new services.

"When we find a customer who is anxious to really push that leading edge, they're like gold to us because that's where we're going to get future product development," Dorman said.

Sefton agreed that users must be increasingly willing to serve as guinea pigs in order to develop applications for some new technologies, such as Integrated Services Digital Networks.

He likened ISDN to push-button service, which was originally introduced to speed up processing of calls through central offices. It wasn't until later that users discovered applications such as home banking and shopping using push-button technology.

Sobczak said Westinghouse was one of the first users of voice mail in the country and that the firm is willing to continue being an early implementor of technology. However, in order for partnerships to work, carriers must make a commitment to long-term development efforts. Too often, carriers have been all talk and no action, he said.

"When you're a user, every company comes up to you and wants to be a partner. The fact of the matter is that most of them are pursuing short-term gains," he said.

If both sides are committed, everyone can benefit. Carriers develop a long-term relationship with a customer and, therefore, are better able to develop products that "hit the mark."

Users will win "because we know we will never be able to develop quality products if we don't get the suppliers working with us," Sobczak said.

CBS awards 3-year, $18m contract to MCI

continued from page 15

between AT&T, US Sprint and MCI, Halsey said. Where MCI doesn't have a point of presence internationally, CBS will still rely on AT&T.

The MCI plan

Under the new arrangement, CBS will use MCI's Vnet virtual private network offering and 800 service.

Vnet will link 33 CBS locations, including five television stations and 20 radio stations, the corporate headquarters and broadcast center in New York and television studios in Los Angeles, as well as other news bureaus, sales and administrative offices.

MCI will also provide CBS with customized billing and cost management through its Customer Information Manager and Network Information Management Service features.

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Worth Noting

The number of electronic payments supported via the National Automated Clearinghouse Association network totaled 1.33 billion in 1989, up 218 million from 1988. Transaction volume is expected to mushroom as more companies add electronic payments to their electronic data interchange programs.

Data Packets

Codex Corp. last week announced enhancements to its 674X series of statistical time-division multiplexers (STDM).

The enhancements let users build larger networks with more sophisticated routing and provide automatic backup for failed links.

Previous versions of the Codex 6740, 6742 and 6745 STDMs allowed users to connect three of the multiplexers, which enabled them to function as a tightly coupled entity, no matter where they were located.

That means the devices dynamically determined the best data path according to user-defined parameters such as least cost or highest speed.

The configuration also supported automatic rerouting around failed nodes.

Codex last week announced that the three-node limit will be extended to 16 nodes next month under an Expanded Networking Option for the 6742 and 6745.

In September, a 32-node option is expected to be available for all three multiplexers.

Also included under the Expanded Networking Option is a feature that supports automatic dial-up of an analog modem or an Integrated Services Digital Network link should a primary circuit fail.

(continued on page 18)

Inside the Help Desk Institute

Founded: January 1989

Business: Offers educational services and products to managers of network help desks in member and nonmember companies

Members:
- ☐ Roughly 1,100 individuals
- ☐ About 900 companies, 80% of which are in the Fortune 500

Membership benefits:
- ☐ Discounts on training classes
- ☐ Access to electronic bulletin board
- ☐ Subscription to bimonthly magazine

Membership fees:
- ☐ $395 for company membership, which covers one individual
- ☐ $125 for each additional individual

Services:
- ☐ Offers 14 training classes in 25 cities in the U.S. and Canada
- ☐ Runs seminars at company sites
- ☐ Runs help desk conferences

Class topics:
- ☐ Guidelines for creating network help desks
- ☐ Ways to improve existing help desks
- ☐ IBM NetView operator training

Products: Working with 28 other companies to develop expert system software that will help automate network help desk functions.

GRAPHIC BY SUSAN SLATER

SOURCE: HELP DESK INSTITUTE, DALLAS

Group provides forum for help desks that need help

Fortune 500 firms turn to institute for instruction.

By Jim Brown
Senior Editor

DALLAS — While network end users turn to help desk personnel to resolve problems, help desk managers at many Fortune 500 companies are turning to the Help Desk Institute for assistance in setting up efficient operations.

Formed just over a year ago, the Help Desk Institute taps noted help desk and network management consultants to teach courses and speak at conferences. Both the courses and conferences guide users in building or improving help desk functions.

The Help Desk Institute offers educational services to member and nonmember companies. Member companies receive discounts on courses and conference fees as well as a free bimonthly publication called *Life-Raft*. More than 900 companies, including AT&T, Holiday Corp., Marriott Corp. and Xerox Corp., have joined the Help Desk Institute.

In addition to courses and conferences, the Help Desk Institute is working with Bendata Management Systems, Inc. and managers from 28 of its member companies to develop expert system software that will automate problem diagnosis and resolution.

The IBM Personal Computer-based HelpDesk Expert Automation Tool software is being designed to prompt help desk personnel to ask specific questions to end users and enter their responses from the keyboard into the application. The software will search a data base to determine the likely causes of a problem and prompt help desk personnel to read to end users suggestions for correcting the problem.

The product is scheduled for delivery this summer and will be marketed to members and nonmembers by Bendata.

The Help Desk Institute has grown quickly since its formation by Ron Muns, a consultant with 20 years of MIS experience.

The training company started out offering just two courses that explained how users can set up help desks.

> The Help Desk Institute is working to automate problem diagnosis and resolution.
>
> ▲▲▲

It now offers 14 classes that cover a variety of personnel, technical and management topics. The courses are offered on a varying schedule in 25 cities across the U.S. and Canada.

The company is also busy preparing for its next conference, which will be held in San Francisco from June 13 to 15. Called Artificial Intelligence and the Help Desk, the conference will focus on how users can employ expert systems to improve their help desk and network management operations.

The Help Desk Institute's first course, called the Introductory

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Hybrid nets raise net mgmt. dilemmas

Users must count on their carriers for network management data they cannot obtain in-house.

By Paul Desmond
Senior Writer

Users intent on combining central office-based data services with private facilities to form a hybrid network should consider the network management issues raised by such a move, users and analysts said last week.

Carrier services, which include central office-based local-area networks and subrate data multiplexing, cannot generally be managed in the same manner as private facilities because users do not have access to the same net management data they receive with private circuits. Instead, they must rely on the carrier to manage the circuits for them, give them access to management data or jury-rig some other solution.

Today, the problem is not one that is overwhelming users, but it is an issue that could make its way to the forefront as carriers roll out increasingly sophisticated central office-based offerings and users opt for such services. Such offerings include software-defined data networks (SDDN), Integrated Services Digital Networks, IEEE 802.6 metropolitan-area nets and broadband ISDN.

Still, even with today's services such as subrate data multiplexing, users must contend with their fair share of management issues.

With subrate data multiplexing, a customer can bundle a number of low-speed data circuits into a 64K bit/sec DS0 channel supported over a private T-1 line.

The carrier's digital access and cross-connect system can break out individual low-speed data channels from the DS0 and ship them to separate locations, such as bank branches or automated teller machines. That obviates the need for the user to lease an inordinate number of separate long-haul, point-to-point subrate digital data service (DDS) circuits.

While this solves one problem, it creates another. The user loses end-to-end management of the subrate data channels when the channels are separated from the T-1 because net management data is intrinsically tied to the way a T-1 channel is built.

British Airways was faced with that very problem when it opted to go with dual T-1 access lines to an AT&T point of presence

(continued on page 18)

DEC to boost DECnet with distributed time service

By Charles Bruno
Assistant Managing Editor

LITTLETON, Mass. — Digital Equipment Corp. last week said it will incorporate a service in DECnet Phase V that would enable net managers to synchronize local and remote servers as well as other devices.

The DECnet Distributed Time Service (DECdts) will provide fault-tolerant clock synchronization for systems on local- and wide-area networks.

DECdts will be an important feature to DECnet Phase V users because it will give them the ability to time-stamp files across the network more accurately, according to Jane Brewer, DEC's product marketing manager for enterprise networking in its Telecommunications and Networks Organization based here.

"As customers move to distributed applications in a peer network environment, the whole issue of network synchronization becomes a hot topic," Brewer said.

Distributed applications would use the time service to determine event sequencing, duration and scheduling. Banks and brokerage customers, for instance, want a mechanism that will assure them that a time-stamped file or transaction will be consistent with time-stamped transactions located at other sites, Brewer said.

"The implications for network synchronization in the financial sector are tremendous; you need this type of functionality to assure the accuracy of a stock trade or bank deposit," Brewer said. "A trade could turn bad just on the time stamp a computer puts on it."

DECdts conforms to the client/server model used in many of DEC's distributed processing

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Hybrid nets raise dilemmas

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(POP) near its Queens, N.Y., North American headquarters, according to Howard Stanislevic, networking engineering manager for the company. It is getting around the issue with the help of its T-1 multiplexer vendor, Avanti Communications Corp., which is tailoring its equipment for just such applications.

In an effort to provide redundancy on the local exchange, British Airways is planning to combine subrate data links, 56K bit/sec DDS and fractional T-1 facilities over a T-1 link to the AT&T POP. The airline plans to use both a terrestrial and microwave T-1 facility, with one backing up the other.

For the subrate links, British Airways is installing subrate data multiplexing facilities to support tail circuits to locations including airports, ticket offices and sales offices, Stanislevic said.

British Airways installed software modules in its Avanti T-1 multiplexers to support subrate data multiplexing. However, those modules cannot respond to the loop-back codes sent by carriers to check line conditions, Stanislevic said. The codes are meant to be sent to a channel service unit/data service unit (CSU/DSU).

Avanti is working to get around that problem by embedding support for the loop-back codes within each individual subrate data channel and, in effect, making the subrate data multiplexing module appear as a CSU/DSU to the carrier's loop-back signal, said Jack Kelley, vice-president of marketing for Avanti. That will let it respond to the carrier's loop-back signals.

The problem is not unique to Avanti products and can be even more complex for other vendors, most of which use a proprietary framing technique between T-1 multiplexers. Avanti uses a carrier-compatible technique between its multiplexers.

Help is on the way

Carriers, meanwhile, are developing management systems to support their various central office-based and private-line offerings. Nynex Corp.'s New York Telephone Co. subsidiary, for example, earlier this month announced a personal computer-based network reconfiguration service whereby users reconfigure individual DSOs within a private T-1 line.

The idea of that service, and others that are in development, is to give the user more of a hand in controlling carrier-based circuits, said Carl Douglas, Nynex's staff director for special services.

Such offerings add another console to the user's net management center, although Douglas said Nynex is working on a NetView/PC application that would tie Nynex's offering to IBM's NetView.

Analysts said carriers will be forced to provide more management capabilities as their services become more complex.

The number of parameters needed to specify an ISDN interface, for instance, is three times that for an X.25 interface, which in turn is 10 times more than that for an analog phone line, according to James Herman, a principal with Northeast Consulting Resources, Inc. in Boston. The interfaces for SDDN, metropolitan networks and broadband ISDN promise to be even more involved.

If users have to rely on the carrier to enter configuration data for each of their lines, as opposed to doing it themselves through a carrier-provided management service, the process will be prone to error, Herman said.

"Some carriers have said they cannot hope to deliver these complex services unless the customer plays an active role in their configuration and ongoing enhancement," he said.

Data Packets

continued from page 17

Alternatively, the feature can be programmed to buttress leased lines automatically during peak periods. The 6742 and 6745 also support the capability over X.25 links.

All the new features are available as software options for a single net license fee of $5,000, plus an additional $500 per node.

BT Tymnet, Inc. and **Touch Communications, Inc.** last week agreed to test their respective X.400-based software to ensure interoperability.

BT Tymnet, a public X.25 network service provider, uses Dialcom, Inc. Pathfinder/X.400 software to offer an X.400 electronic mail interchange service to users.

Touch supplies Worldtalk/400 Gateway software to end users that links a variety of local-area network-based E-mail packages to X.400 networks.

The tests will ensure that different mail packages can use an appropriate Worldtalk/400 Gateway to send mail via BT Tymnet's X.400 network to users of the Dialcom Pathfinder/X.400 service. These packages include Action Technologies, Inc.'s Message Handling Service, cc:Mail, Inc.'s cc:Mail, Microsoft Corp.'s Microsoft Mail, CE Software's Quickmail, the TOPS Division of Sun Microsystems, Inc.'s Inbox and the Transmission Control Protocol/Internet Protocol-based Simple Mail Transfer Protocol.

The tests are expected to be completed next month.

Group provides forum for desks

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Help Desk Course, is still being offered. It is designed to help users determine if they need to develop a help desk and how that help desk should operate.

It also covers what users need to build a help desk and how to staff it. Lastly, the course gives users hints on how to document commonly encountered network problems and prepare scripts that help desk personnel can read to end users over the phone to correct those problems.

"We believe the help desk function has existed since Day 1 of the computer center," said Bart Benne, director of educational development. "But it was oftentimes computer operators or network specialists who answered the phone as part of their other duties. It ordinarily was not well organized or well managed."

Newer courses teach help desk staff interpersonal skills that help them deal with angry or confused end users who dial in for assistance. Other classes offer stress management techniques.

Another series of courses deals with management issues. For instance, there are courses that help managers develop methods to measure the success of a help desk or develop a plan to cost-justify help desk expenses to upper management.

The Help Desk Institute is branching out even further to offer technical training courses that teach help desk personnel how to use IBM's NetView network management software and IBM's Information/Manager software, which helps network operators track problems.

Benne said the company is looking at expanding into courses that cover how to operate other vendor's network management tools. "We're talking with [Digital Equipment Corp.] right now about the possibility of doing some courses on their network management products."

DEC to boost DECnet

continued from page 17

products. In DECdts, a server supplies the time to client workstations through intermediaries called clerks, which reside on the workstations.

Brewer said that because no single server can provide the exact time in an instant, DECdts clerks obtain time intervals from several servers and compute the area where the intervals overlap. A clerk then provides the time interval to a workstation application.

DECdts also comes with a software interface that provides users with a link to satellite-based or radio-based external time services that broadcast Greenwich Mean Time.

Users of DECnet Phase V can use the facility to tune their network devices to the Greenwich Mean Time; once captured, DECdts then reformats the time into local time.

DECdts will also provide a Network Control Language management interface to control and monitor the software.

Brewer said applications running across a DECnet would make the most use of the timing service. For applications that measure the duration of events, a programmer can use a computed time value provided by the service to stop and start timers, she said. Or, for distributed applications that require frequent file updates such as data base processes, the applications can call DECdts to provide time stamps for different file versions.

The initial release of DECnet Phase V will support DECdts in VMS and Ultrix operating environments, Brewer said.

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Worth Noting

"There's no way Olof Soderblom can put Madge [Networks, Ltd.] out of business over this token-ring patent infringement suit. Only 30% of our sales are in the U.S.; the other 70% are in Europe, and he can't touch us there. We expect our sales to double in 1990."

Robert Madge
President and founder
Madge Networks
London

Netnotes

Persoft, Inc. recently announced new versions of its SmarTerm terminal-emulation products that have been enhanced with built-in support of both Digital Equipment Corp.'s Local Area Transport (LAT) protocol and Novell, Inc.'s NetWare.

The LAT and NetWare support enables a personal computer user to run SmarTerm directly from a NetWare file server as well as to employ LAT to connect to a VAX and transfer a file back to the server. The personal computer does not have to be reconfigured or rebooted.

The LAT protocol takes up 33K bytes of memory and can be loaded and unloaded from memory as needed, without having to reboot the workstation.

SmarTerm 240 3.1 and SmarTerm 320 1.1 are priced at $1,495 and $825, respectively, for file server versions supporting as many as five concurrent users across an unlimited number of network nodes.

Single-user versions of SmarTerm 240 3.1 and SmarTerm 320 1.1 are currently available for $345 and $195, respectively.

For more information, contact Persoft at 465 Science Drive, Madison, Wis. 53711, or call the company at (608) 273-6000.

Nat'l Semiconductor FDDI chipset ups throughput

Firm's new chipset boasts 25% improvement.

By Laura DiDio
Senior Editor

SANTA CLARA, Calif. — National Semiconductor, Inc. last week entered the market for Fiber Distributed Data Interface chipsets with the introduction of a product that delivers 25% higher throughput than existing FDDI chipsets.

Called National DP83200, the product is a five-chip 25-MHz device designed to support the physical and data-link layers of 100M bit/sec FDDI fiber-optic token-ring networks.

It is engineered in bipolar CMOS technology and consumes half the power and board space of comparable offerings, according to Karen Parker, National Semiconductor's strategic technical program manager in the Advanced Communications Group.

The bipolar CMOS technology is what provides the chipset with the 25% increase in throughput, she said. The current implementation of Advanced Micro Devices, Inc.'s (AMD) Supernet chipset is a 12-MHz device engineered in bipolar technology, which is not as powerful as National Semiconductor's bipolar CMOS combination, Parker said.

Parker said the chipset can be used on FDDI network interfaces for systems based on the Extended Industry Standard Architecture bus, allowing it to take advantage of high-speed bus-mastering technology.

The bipolar CMOS technology is what provides the chipset with the 25% increase.

▲▲▲

Additionally, National Semiconductor has implemented a full-duplex data path, which enables data packets to be simultaneously transmitted and received across the FDDI ring, thereby increasing performance.

The National DP83200 can "sort" network data traffic ac-

(continued on page 22)

Retix, cc:Mail to jointly develop X.400 gateway

By Walter Sweet
West Coast Correspondent

SANTA MONICA, Calif. — Retix and cc:Mail, Inc. recently entered into an agreement to develop a gateway that will let users of cc:Mail's electronic messaging products access X.400 networks.

The cc:Mail 400 Gateway, which is being codeveloped by the two companies and requires use of Retix's OpenServer conversion software, will enable users on personal computer local-area networks to communicate with systems that support X.400, the CCITT messaging standard backed by more than 200 electronic mail vendors.

The gateway, for example, will enable cc:Mail users to share E-mail with Digital Equipment Corp.'s VMS Mail or All-In-1, Hewlett-Packard Co.'s Desk, IBM's Professional Office System, Sun Microsystems, Inc.'s SunMail and Wang Laboratories, Inc.'s Wang Office.

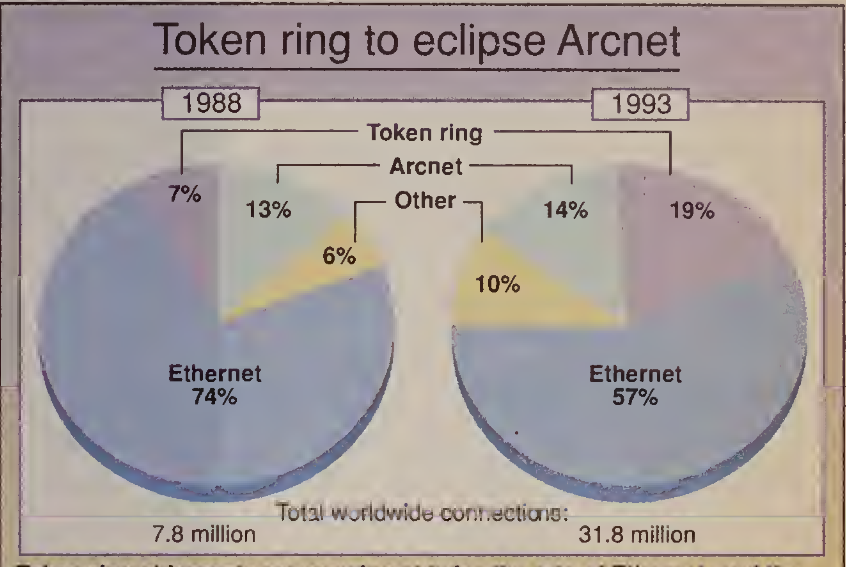
"This agreement opens the door to all the other X.400 environments for cc:Mail users," said Philippe Courtot, president of cc:Mail. Those users will be able to employ cc:Mail commands to access X.400 environments rather than having to learn new tasks.

The cc:Mail 400 Gateway will convert messages from cc:Mail users into the Open Systems Interconnection X.400 message format via Retix's OpenServer, which is DOS software that runs on a dedicated personal computer with cc:Mail gateway software.

According to Retix, several cc:Mail LANs linked by bridges can share an OpenServer 400.

The two companies said the agreement benefits both firms by opening new doors for cc:Mail users and helping Retix sell more of its servers to cc:Mail customers.

Prices for the OpenServer 400 range from $4,000 to $6,000. The more expensive products come with additional transport options and hardware interfaces for capabilities such as packet switching. Although cc:Mail has not set a price for the gateway yet, Courtot said it will be less than $2,000. The product is still under development and is expected to ship to beta sites in June.



Token-ring shipments are growing at twice the rate of Ethernet, and the installed base is expected to overtake Arcnet by 1993. Arcnet numbers, however, vary widely. Some vendors claim there are already more than 3 million Arcnet nodes installed.

GRAPHIC BY SUSAN SLATER SOURCE: ELECTRONIC TREND PUBLICATIONS, SARATOGA, CALIF.

Arcnet community fights for recognition

Trade association discusses ways to enhance LAN's image among token-ring, Ethernet users.

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — The Arcnet Trade Association (ATA) held its first annual Arcnet Trade Show here recently, and one of the main topics of conversation was how to counter the impression many users have that the battle of the local-area networks is over, and that Ethernet and token ring have won.

Vendors say the Arcnet business is booming, though few outside the Arcnet community know it. They claim the three-millionth Arcnet node was recently sold, while many research groups say the installed base of Arcnet nodes is just over a million.

Walter Thirion, chief executive officer of Thomas-Conrad Corp., a manufacturer of Arcnet products in Austin, Texas, said Arcnet's image problems are exemplified by a company he knows in Utah. "They have 300 Ethernet nodes and 1,200 Arcnet nodes, and they call themselves an Ethernet shop," he said.

One area in which Arcnet has a large and growing following is factory automation. Johnson Controls, Inc. of Milwaukee, the nation's largest manufacturer of process control equipment, recently standardized on Arcnet, for example, as did Opto 22, Inc. of Huntington Beach, Calif.

However, Arcnet's appeal in the factory LAN niche is not necessarily transferrable to other segments of the market, since the factory floor has special real-time requirements to which Arcnet is uniquely suited. The challenge for the ATA is to convince users that Arcnet can hold its own against Ethernet and token ring in a general office automation environment.

One of the misconceptions about Arcnet, according to ATA members, is that it's too slow. They say the 2.5M bit/sec Arcnet can often outperform 10M bit/sec Ethernet and 4M bit/sec token ring in transaction-oriented applications that typically involve lots of small packets.

Ethernet performs best when handling a few large packets instead of many small ones, because each additional packet, regardless of size, represents another potential collision. When packets collide, they have to be retransmitted. Similarly, token-ring packets each have a large, fixed overhead so they are not optimized for carrying small amounts of data.

"They have 300 Ethernet nodes and 1,200 Arcnet, and they call it an Ethernet shop."

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"Arcnet can do better at anything to do with small packets," said Robert Hollingsworth, senior director of engineering at Datapoint Corp. However, it is slower at tasks involving bursts of large packets, like those generated by a diskless workstation booting itself across a network from a server.

At the end of this year, the Arc-

(continued on page 22)

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Arcnet community fights for recognition

continued from page 19

net industry will put a lid on the too-slow arguments when it introduces a version of Arcnet with a data rate that makes it eight times faster than the existing Arcnet LANs, twice as fast as Ethernet and 25% faster than the 16M bit/sec token ring.

Called Arcnet Plus, the new version also has a unique backward interoperability with 2.5M bit/sec Arcnet. Users will be able to mix the two types of adapters on a single LAN segment. The 20M bit/sec boards will communicate at that speed when talking to one another and slow down to 2.5M bit/sec when talking to the older adapters.

This is in sharp contrast to the token-ring environment, where an entire LAN segment has to use either 4M bit/sec or 16M bit/sec adapters, and the two are not interoperable.

Arcnet Plus also eliminates at least two more key objections to 2.5M bit/sec Arcnet: It supports the 48-bit station addresses used by the IEEE 802 network protocols and the 32-bit station addresses used by Transmission Control Protocol/Internet Protocol, while still using 2.5M bit/sec Arcnet eight-bit station address format and assuring backward compatibility.

Additionally, Arcnet Plus permits data packets as large as 4,224 bytes, up from the 508-byte packet limitation of the existing Arcnet. This means Arcnet will be able to send almost any transport-level segment, such as a full 776-byte NetWare Internetwork Packet Exchange (IPX) packet, in a single-packet transmission.

The 20M bit/sec Arcnet chipsets should be available from Standard Microsystems Corp. and NCR Corp. before the end of the year, and users should see the first products hit the market early in 1991, according to Ernest Wassmann, ATA chairman and director of product marketing at Esprit Systems, Inc. in Melville, N.Y.

The 20M bit/sec Arcnet chipsets should be available from Standard Microsystems and NCR before the end of the year.

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Meanwhile, the ATA members expect the opening up of Eastern Europe to provide a big boost for Arcnet because there are few network experts there. In this type of environment, reliability and ease of installation are a must.

"The best demonstration of how well Arcnet works under adverse conditions is the fact that it has the largest installed base in the Soviet Union," said Bob Spickerman, a partner with Network Display Devices, Inc. "It's dependable, quick to debug and easy to set up."

Arcnet also virtually assures multivendor interoperability, unlike Ethernet and token ring. The Arcnet adapters rolling off the assembly lines today will work with the original prototypes Datapoint built back in 1977. Every Arcnet node in the world runs exactly the same link-level microcode.

Every vendor uses the Datapoint design as a blueprint, while Ethernet and token-ring products are based on vendor interpretations of the written standards developed by the IEEE 802 LAN technical committees. ◪

FDDI chipset ups throughput

continued from page 19

cording to whether it is high or low priority — such as a large batch file transfer or an electronic mail message — resulting in more efficient buffer management, Parker said. The National DP83200 incorporates several other built-in features and capabilities, such as network management and fault isolation and detection, Parker said.

The DP83200 incorporates on-board network management and diagnostic features, including a station management capability that will enable net administrators to determine network traffic levels.

"Our [station management] feature for the first time will let the network administrator detect whether a particular workstation, network bridge or internetwork router has insufficient memory to accept a particular data transmission and if it is dropping data packets and causing network errors," Parker said.

And since the station management capability is on the chipset, users will save money by not having to buy a separate external box for station management, as they do now with the AMD chipset.

The National DP83200 conforms to the emerging FDDI ANSI X3T9.5 standard and will be fully interoperable with the existing AMD chipset, as well as the jointly developed Motorola, Inc./Digital Equipment Corp. FDDI chipset due out later this year, Parker said.

National Semiconductor is conducting interoperability testing at its own labs and is also participating in similar tests at the University of New Hampshire's FDDI test facility in Durham, Parker said.

The DP83200 is expected to ship in volume quantities in the third quarter. It costs $350 in quantities of 100. ◪

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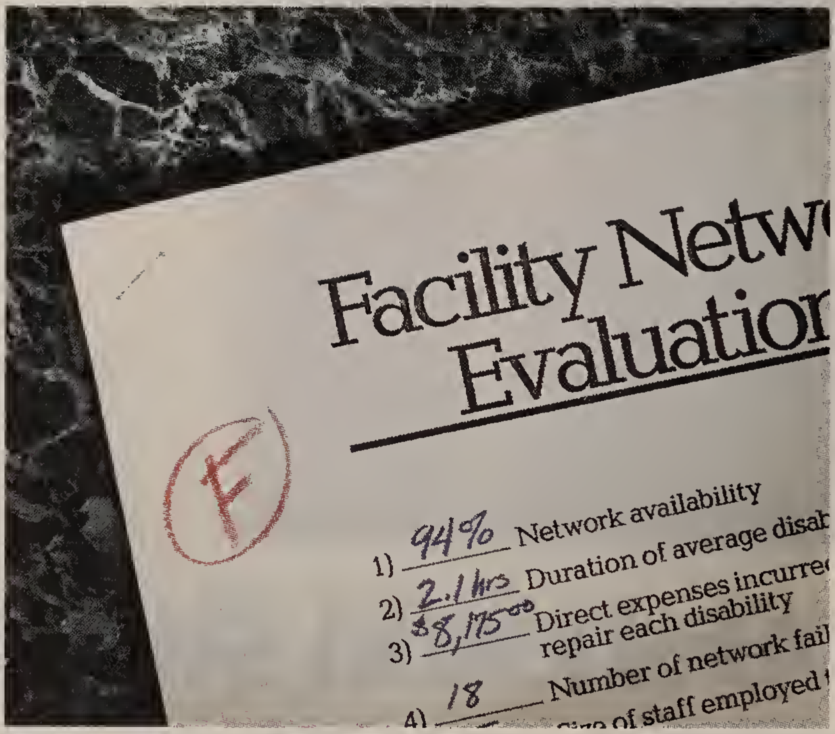
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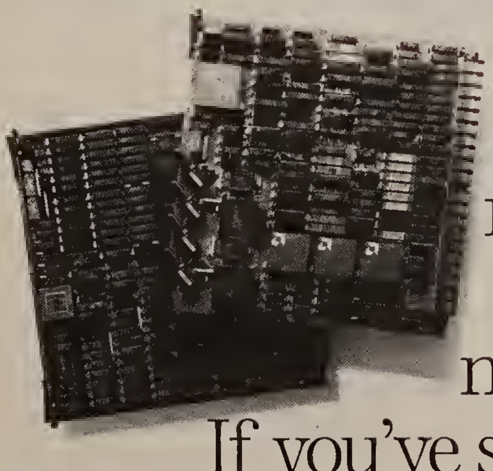

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See the FAXNeT Form on Page # 42

MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS

Dialogue

What impact will the merger between Lotus Development Corp. and Novell, Inc. have on users?

"The deal creates a bigger company. So what? Until Lotus and Novell can bring to the table a competitive vision, like Microsoft [Corp.]'s, customers won't benefit. Until they develop some joint products or a total application solution — perhaps a Lotusware or NetWare 1-2-3 — what's the big deal?"

Rick Segal
Technical advisor
The Aetna Casualty and Surety Co.
Hartford, Conn.

"I am concerned that it will have a negative impact on Novell. Novell has always been very open and willing to discuss future plans and architectures with us. I hope this doesn't change.

"It seems like an odd merger because all previous Novell acquisitions made a lot of sense. They strengthened Novell. This appears to strengthen Lotus more than Novell."

Stewart Robinovitz
Coordinator of network planning
University of Michigan
Ann Arbor

"Let's hope the best of both companies come to the forefront in the management of the new organization: Novell's high-quality customer support and the functionality and seamless integration of Lotus products. If that happens, it will be a great marriage, and we should all be celebrating the wedding."

Brian Cary
Director of technical support
American Bar Association
Chicago

"Many users are concerned about what will happen to the quality of support Novell provides small users.

"Traditionally, Novell has focused on serving the smaller users, while Microsoft and Lotus have paid more attention to the Fortune 500. The deal seems to indicate that Novell is more eager to play in the big business market."

Merton Nickerson
Director of academic computing
University of Southern Maine
Portland

MANAGEMENT PROFILE

▲▲▲

The Ohio State University Hospitals campus

Hospital seeks net flexibility with HL7

By Wayne Eckerson
Senior Writer

COLUMBUS, Ohio — The current pace of technological change often makes it difficult for users to know when to risk investing in leading-edge developments and when to stay the course.

One company that believes the potential benefits of adopting new technology outweigh the risks is The Ohio State University Hospitals.

The 1,000-bed teaching facility here, comprising six different hospitals, is in the midst of replacing a mainframe-based, centralized information system (IS) with a distributed architecture based on an emerging health care communications standard called Health Level 7 (HL7). The hospital is counting on the standard to give departmental users greater flexibility in selecting systems that best meet their needs.

"We're pushing the technology envelope, but we're confident the risk we're taking will pay off," said Landen Bain, administrator of IS at the hospital.

"The conventional wisdom is that it's safer to stay with a single-vendor centralized system," Bain said. "In our view, that's just as risky, because technology is advancing so fast that today's systems may easily be obsolete tomorrow."

The foundation of the network is a fiber-based Ethernet that will eventually enable physicians, nurses and administrators to use a common interface to access patient data stored on network-attached mainframes, minicomputers and personal computer local-area networks.

By next year, the Ethernet backbone will interconnect systems used in about a dozen departments, including laboratory, radiology and a cardiac intensive care unit.

Additional departmental systems will be added as they are upgraded, Bain explained.

Open architecture

Bain said the distributed architecture will give departments greater autonomy to select systems and solve problems on their own rather than waiting for IS to respond to their needs.

The only restriction, Bain said, is that departments must purchase systems that conform to HL7 protocols, which specify a standard application interface to lower level communications protocols such as Transmission Control Protocol/Internet Protocol and Digital Equipment Corp.'s DECnet.

Using HL7 eliminates the need to develop costly custom interfaces to connect departmental systems to the shared network, said Boyd Carlson, assistant director of network support at the hospital. "HL7 is critical for us," Carlson said. "It will save us years of work."

Bain said an open network architecture will make it easy for the hospital to move departmental systems in and out of the network when users choose to upgrade. The systems will be able to communicate on a peer-to-peer basis, he said.

For example, Ohio State's IBM mainframe, which formerly supported lab, radiology and patient administration applications, now will be just one node on the network and will handle just patient billing and administration.

The IBM processor's peers will

(continued on page 28)

Users praise positives of network design software

Tools save time, money and help plan for future.

By Joe Panepinto
Staff Writer

Network managers fighting to eliminate inefficiencies in net design and operation should look to add a network design tool to their arsenal, experienced users say.

The growing array of networking possibilities has made network design more difficult. Compounding the task, frequent fluctuations in the prices of equipment and telecommunication services change the cost-to-performance ratios of already-constructed nets, making previously winning designs inefficient.

"I've optimized dozens of nets with network design tools, and I've never seen a network where we didn't save money," said Harrell Van Norman, a communications engineer with Mound Applied Technologies Group of EG&G, Inc. in Miamisburg, Ohio, a production facility for the U.S. Department of Energy.

Van Norman said most net design tools allow users to modify a number of variables, including number and type of nodes, topology, protocols, transmission media and tariff information. At the same time, the tools allow users to run an analysis of each of the changes on net performance.

Some net design tools analyze only net capacity and throughput, while more expensive packages include complex pricing algorithms for finding the configuration that would operate most cheaply.

Net design tools are the key to what Van Norman calls a holistic methodology, a cyclical process whereby a net manager continually analyzes, evaluates and optimizes net design (see graphic).

In the network awareness

(continued on page 28)

Three phases of network design

1 **Network awareness** – gather knowledge about current functionality of network.

2 **Network optimization** – use net design tools to evaluate alternative configurations.

3 **Network management** – implement net design.

Network design is a cyclical process in which the net manager continually analyzes, evaluates and optimizes net design.

SOURCE: HARRELL VAN NORMAN, MIAMISBURG, OHIO
GRAPHIC BY SUSAN J. CHAMPENY

GUIDELINES

BY BRUCE ELBERT

Tips for new managers in the heat of a net crisis

Crisis situations are an inescapable part of a network manager's job. The growing complexity of networks makes company communications increasingly vulnerable to natural disasters, power outages, electrical fires, network software glitches and cable cuts. Skilled network managers must know how to react under pressure to restore network services before an outage cripples their company's bottom line.

Here are some tips for dealing with a network crisis:

- **Gather data.** During a crisis, meet with key people to gather as much data on the problem as possible. Be persistent with common carriers; they may provide misleading data on the cause of an outage. Carefully review all error messages, printouts, meter and LED readings from network equipment.
- **Troubleshoot the problem.** List on a white board or flip chart the possible causes of the problem and potential solutions to each cause. Use flow charts, tables, network block diagrams and trouble reports to look at the problem from different angles.
- **Restore services partially.** Try to restore as much

(continued on page 28)

Elbert is director of operations for a large communications company and author of several books on telecommunications and information technology.

Tips for managers in the heat of a crisis

continued from page 27

network capability as possible through dial backup. If dial backup isn't available and service can't be restored immediately, use alternate means, such as electronic mail through a value-added network or a temporary private-line circuit. Make sure the senior management of all vendors is aware of the problem and is held accountable.

- **Level with users.** Keep users informed of the situation. Level with them; tell them the seriousness of the problem and your current approach. Maintain your objectivity and, even more important, your honesty.
- **Lead by example.** Stay cool and provide leadership by example. Do a lot of listening and allow others to contribute.
- **Monitor resources.** Carefully monitor the allocation of scarce resources, such as test equipment, which may be needed at several locations at the same time. Test these devices to make sure they work properly. Emphasize the importance of personal safety.
- **Implement a solution.** Devise a plan to restore network services and set a timetable for completion. Assign responsibility for corrective action to network staff. Keep tabs on progress and continue to hold meetings or teleconferences as needed.
- **Follow through.** As network services are restored, stay in close contact with users and conduct tests to make sure the network is running normally.

Users praise positives of net design tools

continued from page 27

phase, a net design tool allows net managers to gather information about the current functionality of an existing network by reconstructing a graphical representation of the net and analyzing simulated traffic flows.

The second phase — network optimization — is where net design tools are most helpful, Van Norman said. In this phase, net managers use the tools to manipulate the variables in the networking equation, including configuration, hardware and software options.

From the simulation, a network manager can find a design that is optimal for the type of traffic planned for the net.

Finally, in the network management phase, the net manager implements the new configuration or changes the existing network to match the simulation created by the network design tools.

While at NCR Corp., Van Norman used a net design tool to optimize a wide-area network in the data services division. Van Norman fed the existing net topology, number of users and the type and volume of traffic into the software, and got back a hierarchical list of WAN configurations optimized by cost.

The top design generated by the tool lowered annual telecommunications spending from $11 million to less than $8 million, a savings of more than 30%.

Leonard Evenchik, director of data communications in the Office of MIS for The Commonwealth of Massachusetts, used a combination of in-house and commercial net design tools to find similar savings in the WAN design of an instate multidrop analog voice network.

Using the net design tools, Evenchik consolidated many of the multidrop sites on a newly configured T-1 backbone that would save the state $5,000 per month per drop.

"Belts are tightening all over the [information systems] industry," Van Norman said. "If you don't start using tools that will make your job more effective, and your competition does, you're going to lose out. It's just that simple."

Hospital seeks net flexibility with HL7

continued from page 27

be DEC VAXes that support laboratory, oncology and surgery departments. Other network applications, such as neurology, cardiology and intensive care applications, are slated to run on personal computer LANs running Novell, Inc.'s NetWare.

"As long as vendors conform to HL7, we can essentially just plug their equipment into the network," Carlson said.

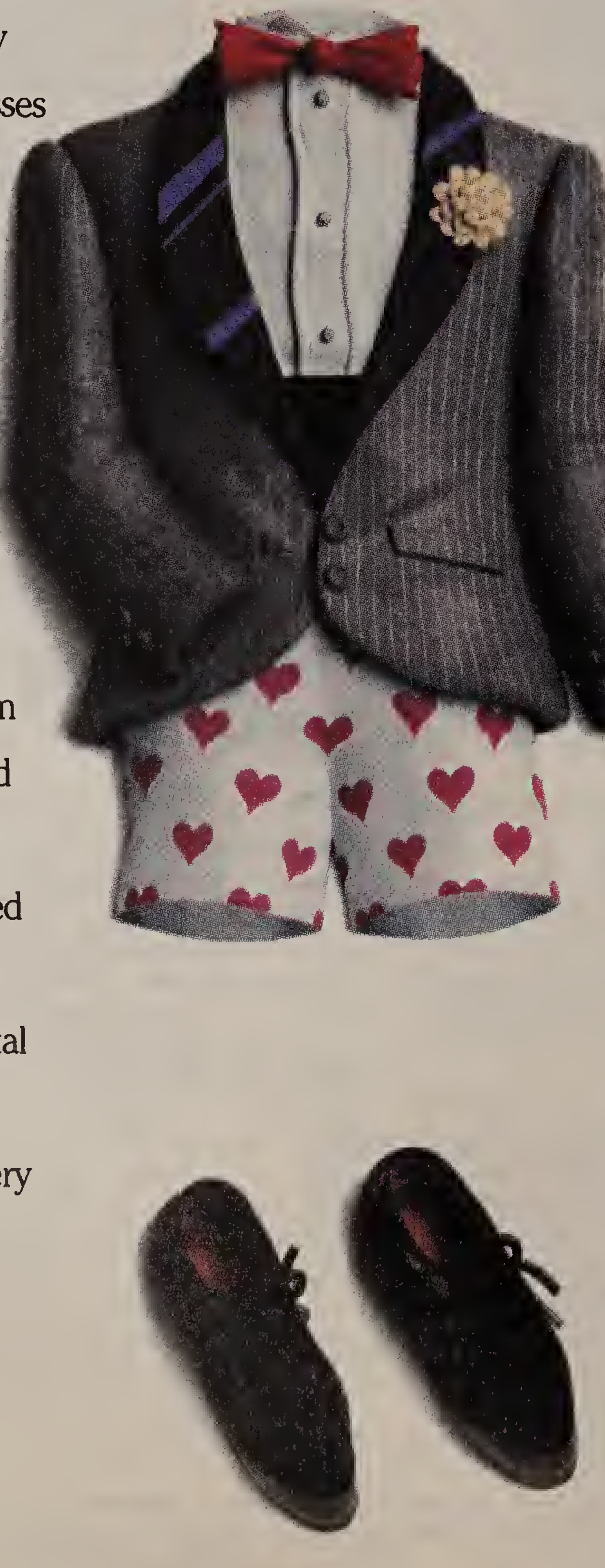
Terminal access and routing

Currently, about 60 nurses and physicians have access to the network via a custom application called Clinical Information System (CIS). CIS software, which resides on a cluster of DEC VAX processors, contains communications interfaces to all departmental systems on the network, giving users transparent access to data on any system.

CIS enables users working at dumb terminals on the network to call up patients' admission histories, radiology tests, lab results and physician reports from departmental data bases across the net. Personal computer users on LANs can access CIS through terminal-emulation software.

Unlike centralized systems in which all patient information is stored in a data base controlled by a host computer, Ohio State's architecture allows data to be kept where it is generated. The network allows users to access the data from departmental systems via the CIS agent.

A CIS agent on the VAX cluster takes incoming requests for information from end users and sends them to the appropriate network server in the VAX cluster. These servers then route requests via a task-to-task interface across the network to departmental systems on which the requested information resides. The data is then sent back the way it came.



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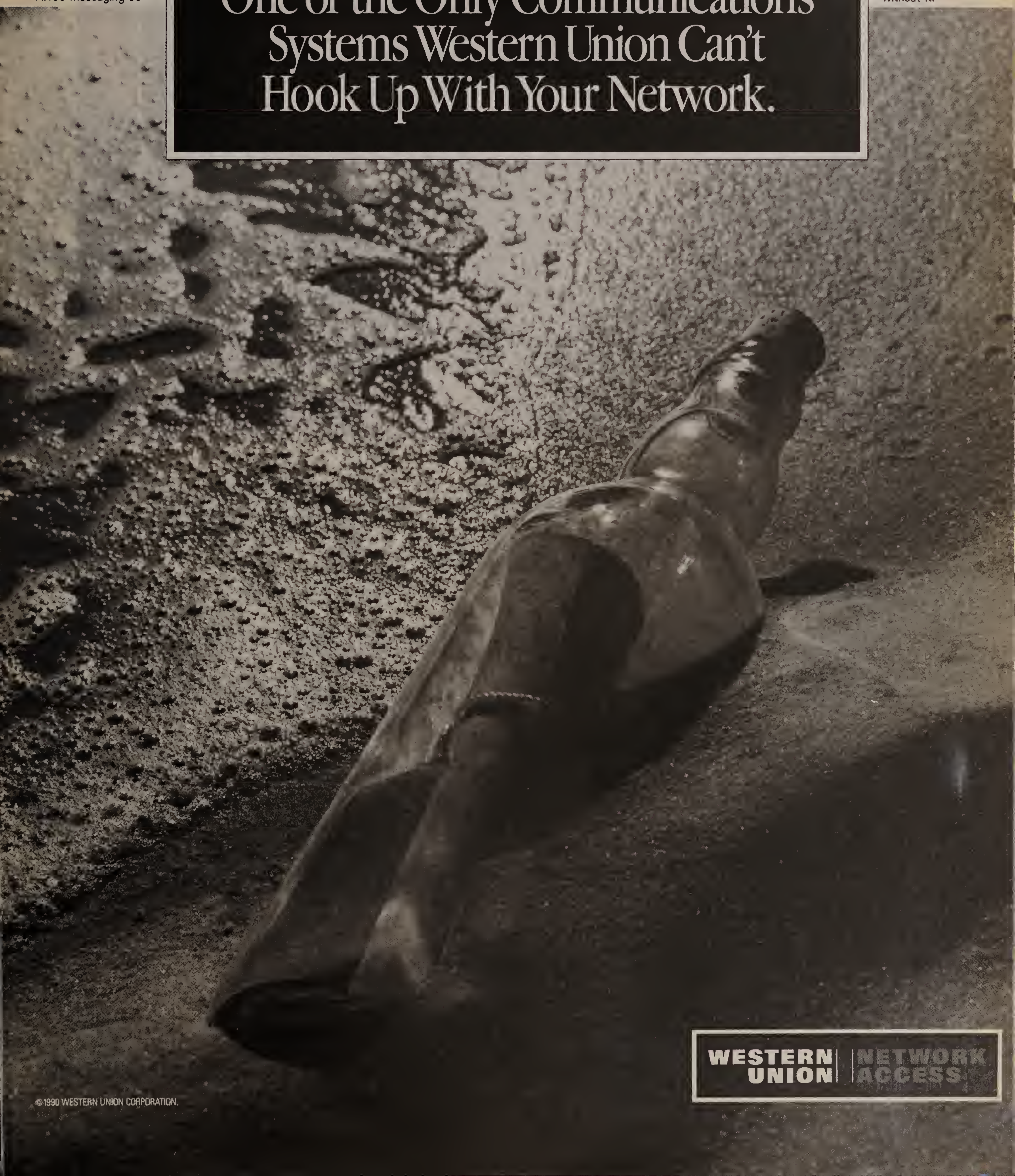

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USER STRATEGIES, INTERNATIONAL SERVICES & REGULATION

Worth Noting

> "If a country doesn't have good communications [through the public network], it doesn't stay a major player in financial services very long."

Bowley Moore
Vice-president
Strategic planning
and communications
J.P. Morgan & Co., Inc.
New York

World News

AT&T last week announced it will begin supporting switched 64K bit/sec service to France starting May 15. The service, called Switched Digital International Service, must be accessed via either a Primary Rate Interface Integrated Services Digital Network connection to an AT&T point of presence or a Basic Rate Interface ISDN connection to a local carrier.

Switched transmissions are carried to France at a cost of $2.76 for the first minute and $2.30 for each additional minute. This is the same price AT&T charges for switched 56K bit/sec service to France, which it has offered since April 1988.

On the French side, users must receive switched 64K bit/sec transmissions via France Telecom's Numeris ISDN service.

AT&T currently offers switched 56K and 64K bit/sec service to the U.K. and Japan. In each country, the service must be accessed by ISDN connections to local carriers. AT&T also supports switched 56K bit/sec to Jamaica.

Later this year, **France Telecom** will begin supporting the collocation of user-owned equipment at a net operation center in Paris, according to Joe McQuaid, vice-president of sales and marketing with France Telecom, Inc. in New York. Currently, the carrier only allows users to collocate equipment leased from France Telecom.

Digitization of public net puts France in ISDN lead

France Telecom plans nationwide service by 1991.

By Raymond Boult
Special to Network World

Integrated Services Digital Networks are at various stages of implementation in the industrialized areas of the world, including the U.S., Japan and Europe.

But one country, France, has a head start on all the others, mainly because of an unrelated decision, made nearly 20 years ago, to digitize virtually the entire public network.

The digitization effort began in 1974, and about 70% of the French public network, including central office switches and trunk lines, were digital by the time ISDN was officially inaugurated in November 1988. The service, dubbed Numeris, supports the Basic Rate Interface and the European 30B+D Primary Rate Interface.

Since the public network is nearly all digital, it has been relatively easy for France Telecom to expand the reach of its ISDN offerings. France Telecom plans to make ISDN available nationwide by 1991.

Boult is a Paris-based journalist specializing in telecommunications.

Although it is the most popular ISDN application in the U.S., automatic number identification is mistrusted in France and not widely used. However, users are exploring other applications and seem generally enthusiastic about ISDN technology.

In order to create a critical mass of ISDN users to ensure its success, France Telecom is partially financing the development of many pilot ISDN applications.

France Telecom's partners in this operation are users and telecommunications and computer software and hardware companies, including Apple Computer, Inc., Data General Corp., Digital Equipment Corp., Hewlett-Packard Co., IBM and ICL, Inc.

Among the first ISDN users is consumer electronics vendor Service S.A., based here. Service S.A. is pilot-testing an ISDN system with 10 repair companies. Those firms will use the service to gain dial-up access to an optical disk jukebox, which stores blueprints of such things as televisions and compact disk players.

These blueprints are then downloaded into personal computers at a repair office. The ap-

(continued on page 34)

Fiber advance ups capacity of undersea cables to 2.4G

By Barton Crockett
Senior Editor

NEW YORK — British Telecommunications PLC said it has invented a fiber-optic technology that will enable undersea cables to support transmission speeds up to 2.4G bit/sec, more than five times the fastest rate currently supported.

The discovery, disclosed by researchers at British Telecom Research Laboratories in Martlesham, England, earlier this month, is essentially a new laser transmission technology that reduces errors and signal dispersion, according to Keith Newell, vice-president for technical support at British Telecom, Inc., the U.S. subsidiary of the London-based carrier.

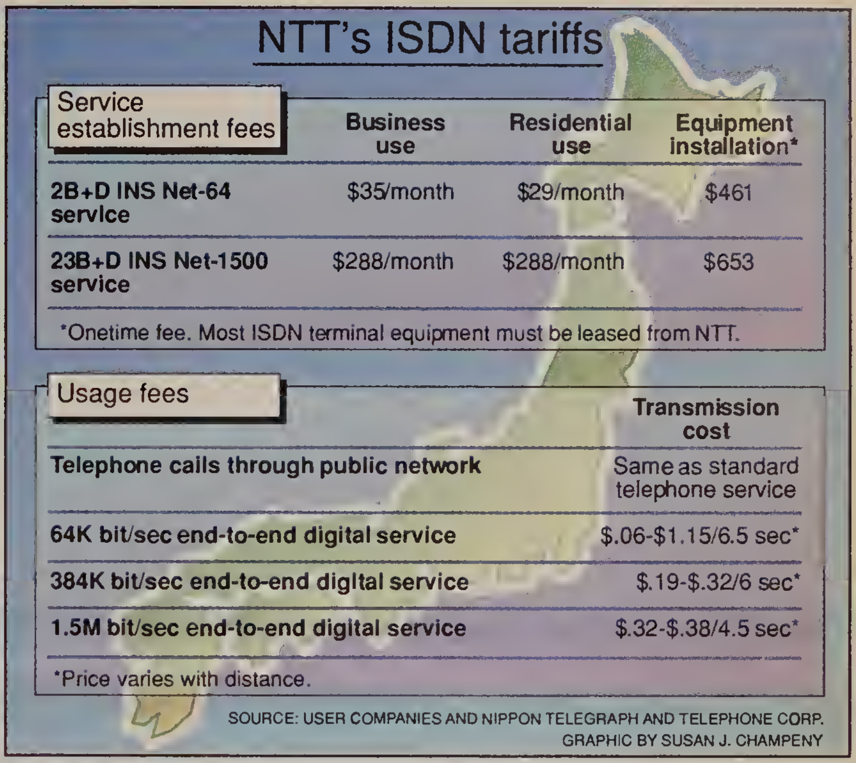
Newell discussed the advance at a meeting of the New York chapter of the International Electrical and Electronics Engineers, Inc.'s Communications Society here last week.

Currently, the highest capacity undersea fiber-optic cable in use is the Private Trans-Atlantic Telecommunications-1 (PTAT-1), jointly owned by US Sprint Communications Co. and London-based Cable & Wireless PLC. The cable has two fiber lines that each operate at 420M bit/sec.

1.8G technology

While the new British Telecom technology will support transmissions more than five times faster than that, Roger Hattam, group manager of network development at Cable & Wireless, said that a fiber to be installed between the U.K. and West Germany in 1992 will support 1.8G bit/sec speeds using technologies other than the one developed by British Telecom.

Newell said the 2.4G bit/sec transmission system is the fastest ever developed, adding that British Telecom may begin deploying the technology on the TAT-10 undersea fiber-optic cable, expected to be cut over in 1994, as well as several fiber-optic cables spanning the English channel.



NTT's ISDN tariffs

Service establishment fees	Business use	Residential use	Equipment installation*
2B+D INS Net-64 service	$35/month	$29/month	$461
23B+D INS Net-1500 service	$288/month	$288/month	$653

*Onetime fee. Most ISDN terminal equipment must be leased from NTT.

Usage fees	Transmission cost
Telephone calls through public network	Same as standard telephone service
64K bit/sec end-to-end digital service	$.06-$1.15/6.5 sec*
384K bit/sec end-to-end digital service	$.19-$.32/6 sec*
1.5M bit/sec end-to-end digital service	$.32-$.38/4.5 sec*

*Price varies with distance.

SOURCE: USER COMPANIES AND NIPPON TELEGRAPH AND TELEPHONE CORP.
GRAPHIC BY SUSAN J. CHAMPENY

Japan ISDN services attract leading users

Ubiquity of national carrier NTT simplifies the the deployment and use of the digital services.

By Lori Valigra
IDG News Service Asian Bureau

TOKYO — The Japanese like to be the first to use new technology, and Integrated Services Digital Network is no exception.

Blessed with two standardized ISDN offerings from the country's dominant carrier, Nippon Telegraph and Telephone Corp. (NTT), users in Japan have been moving aggressively to deploy ISDN as a strategic part of their business.

By the end of last March, there were 6,600 Basic Rate Interface (BRI) lines and 120 Primary Rate Interface (PRI) lines in use in Japan, in addition to the ISDN services NTT uses internally.

NTT's 2B+D BRI offering, introduced in April 1988, is called INS Net-64. Its PRI equivalent, which can be set up as either 24B or 23B+D, was cut over in May 1989 and is called INS Net-1500.

Ubiquitous service

Both services are available in 200 major cities in Japan, and NTT plans to expand the service to smaller cities and villages to have a total of 1,000 ISDN locations by the end of next February.

"Anyone, anywhere will be able to use it," said Tadao Mozumi, general manager of NTT's ISDN development and promotion department.

"NTT is giving away ISDN lines very cheaply to get them installed widely," said Roger Boisvert, a systems consultant for a major international consulting company in Tokyo. "Once they are installed, they will get the volume to make money on them."

Ishikawajima-Harima Heavy Industries Co., Ltd. illustrates the progressive use of ISDN by Japanese companies. The $4 billion heavy machinery maker, based here, plans to use ISDN in two locations.

It already employs two INS Net-64 lines between its Tokyo headquarters and Tokyo Bay plant to transmit Group IV facsimile messages. In June, it plans to deploy an INS Net-1500 network to link its five operations in the eastern port city of Yokohama.

The five INS Net-1500 lines will initially support voice calls between plants, but later this year the company will add data support to enable its 1,000 engineers to communicate among plants and with customers. The INS Net-1500 facilities will replace 80 analog telephone lines.

The ISDN network in Yokohama will complement a planned 100M bit/sec Fiber Distributed Data Interface local-area network and a nationwide leased-line net used by its employees to access supercomputer and mainframe-based applications at company sites throughout Japan.

Dai Nippon Printing Co., Ltd., also based in Tokyo, is a heavy user of Group IV facsimile over ISDN lines. The top Japanese printer produces some 60% of all of the magazines in Japan. It prints a different magazine every five minutes all day, seven days a week. Dai Nippon uses facsimile to send preproduction copy to its clients for approval.

Dai Nippon has 30 INS Net-64

(continued on page 34)

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1500 LBS.; SUPERSTORES NORTH AMERICA, CHICAGO, IL, 4/02, 1200 CARTONS, FREIGHT CLASS 235, 300 LBS.; LIGHTS INC., TOPEKA, KA, 450
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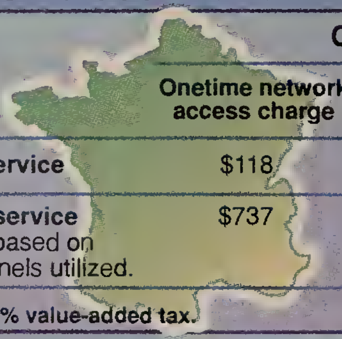
France Telecom's ISDN tariffs



Service	Cost*	
	Onetime network access charge	Subscription fee
2B+D Numeris service	$118	$53/month
30B+D Numeris service Plus variable fee based on number of B channels utilized.	$737	$168/month

***Not Including 18.6% value-added tax.**

GRAPHIC BY SUSAN J. CHAMPENEY SOURCE: GOVERNMENT AND COMPANY REPORTS

Digitization puts France in lead

continued from page 31

plication enables service people to access the most recent blueprints, rather than relying on paper copies of blueprints in their offices.

Credit Lyonnais, one of France's largest commercial banks, told *Network World* that it will use France Telecom's ISDN offering as a switched backup to a 64K bit/sec nationwide leased-line network it calls Elan.

The company said that switched backup via ISDN connections is less expensive than using dedicated lines for redundancy. Other French banks, such as Banque Nationale de Paris, are likely to use ISDN in a similar manner. ◘

Japanese ISDN attracts users

continued from page 31

lines at its plants in Tokyo, Osaka and Fukuoka. It has 10 INS Net-1500 lines linking Tokyo and Osaka. Those lines are kept separate from its 64K bit/sec corporate digital network, which links about 80 sites throughout Japan.

Dai Nippon is typical of many Japanese users. Currently, it sees ISDN primarily as a low-cost alternative to its leased-line connections for Group IV facsimile transmissions.

NTT estimates that Group IV facsimile is one of its most popular ISDN applications, accounting for nearly one-third of all of the facsimile traffic sent over its network.

Although Dai Nippon has not tallied its savings from using ISDN lines instead of analog telephone lines, it did have one example: In Kyushu in western Japan, it has six INS Net-64 lines that it uses for Group IV facsimile. With analog lines, it was paying $3,333 per month; with ISDN, it pays $533.

Such savings have made ISDN popular in Japan. NTT charges $36 per month for INS Net-64 and $300 per month for INS Net-1500.

No ISDN islands

More important than the price savings, ISDN is catching on in Japan in part because users are not faced with difficulties associated with so-called "islands of ISDN," a major obstacle to ISDN use in the U.S.

This phenomenon is the result of incompatibilities between different makes of central office switching equipment and implementation differences between local and long-haul carriers.

Japanese users, on the other hand, rely on one standard from one service supplier: NTT.

"Japan is highly advanced compared to the United States," Boisvert said. "The United States needs a standard or it will have a lot of problems interconnecting worldwide. Until companies [in the U.S.] learn to standardize, they will not sell much. Japan has, in its favor, a single standard, which probably will be the international standard."

Boisvert puts Japan about four years ahead of the U.S. in the actual number of ISDN users and about 10 years ahead in terms of the percentage of the population using ISDN. Although he thinks Japan has a two-year edge in ISDN technology development, he expects the U.S. to catch up in two years and even surpass Japan.

But a key to getting ISDN more widely used in both countries is terminal adapters and equipment. "Terminal adapters need to decrease in price. And they won't drop substantially in Japan for another two years," Boisvert said. ◘

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PRODUCTS & SERVICES

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First Look

Compaq unveils 32-bit token-ring adapter

Compaq Computer Corp. recently announced a 32-bit token-ring adapter for the Extended Industry Standard Architecture (EISA) bus in its new Deskpro 486 workstation and SystemPro superserver.

The Compaq **32-Bit DualSpeed Token Ring Controller** operates at both 4M and 16M bit/sec over shielded and unshielded twisted-pair cable. The product uses EISA bus master technology to transfer data to and from system memory at rates of up to 33M byte/sec.

The 32-Bit DualSpeed Token Ring Controller comes with drivers optimized for Novell, Inc.'s NetWare 386, NetWare 2.1X and Microsoft Corp.'s LAN Manager. It costs $1,299.

Compaq Computer Corp., P.O. Box 692000, Houston, Texas 77269; (713) 370-0670.

Racal adds V.42 and V.42bis to modems

Racal-Milgo recently announced new versions of several existing modems that support V.42 error correction and V.42bis data compression standards.

The products now supporting the standards are: RMD 3222, RMD 4492E, VI 4491E and VI 2422PA.

V.42 error correction incorporates the Link Access Procedure M protocol and Microcom, Inc.'s Microcom Network Protocol Classes 2, 3 and 4. V.42bis compresses data at a 4-to-1 ratio.

RMD 3222 is a 9.6K bit/sec V.32 modem. The new release costs $1,595.

RMD 4492E is a V.22bis 2,400 bit/sec rack-mounted dual modem. It is priced at $1,395.

VI 4491E is a single-modem version of the RMD 4492E intended for international users. It costs $840.

VI 2422PA is a V.22bis 2,400 bit/sec modem. It is intended for international and domestic use. The product is priced at $795.

Racal-Milgo, 1601 N. Harrison Pkwy., Sunrise, Fla. 33323; (305) 846-1601. ◘

Gateway links QuickMail to MHS-compliant packages

CE Software links Apple, NetWare E-mail users.

By Tom Smith
New Products Editor

WEST DES MOINES, Iowa — CE Software, Inc. recently introduced a gateway that enables users of its QuickMail electronic mail software to exchange messages with users of Novell, Inc. NetWare's Message Handling Service (MHS).

The software, QM-MHS Gateway, resides on Apple Computer, Inc. AppleTalk servers running QuickMail. It translates addresses and message contents between QuickMail and MHS formats. MHS, developed by Action Technologies, Inc., comes bundled with NetWare.

QM-MHS Gateway works with any MHS-compliant E-mail package, including cc:Mail, Inc.'s cc:Mail and WordPerfect Corp.'s WordPerfect Office.

The gateway is the first product to translate directly between an AppleTalk E-mail program and MHS, according to Dave Loverink, QuickMail product manager at CE Software. Touch Communications, Inc. recently unveiled X.400 gateways for QuickMail and MHS, which allow users on the two different E-mail systems to communicate over an X.400 backbone ("Touch unveils X.400 gateways for LANs," *NW*, April 9).

QM-MHS Gateway allows users of QuickMail and MHS to address messages to a user alias, which can be used instead of a complex network address. The gateway translates the alias into a QuickMail or MHS address for delivery of the message, Loverink explained. The gateway will also conduct content mapping.

With QM-MHS Gateway, users can append files and documents, such as those created in a word processing program, to an E-mail message.

QM-MHS Gateway is capable of communicating across several different hardware setups connecting the AppleTalk and NetWare LANs. For example, users can install physical gateways such as Cayman Systems, Inc. GatorBox, which converts between LocalTalk and Transmission Control Protocol/Internet Protocol; NetWare supports the latter even if the NetWare server and nodes do not communicate using TCP/IP, Loverink explained.

Users can also install an EtherTalk or TokenTalk interface card into the NetWare server. EtherTalk and TokenTalk are Apple implementations of Ethernet and token ring, respectively.

QM-MHS Gateway is available now for $200.

CE Software can be reached by writing to 1854 Fuller Road, P.O. Box 65580, West Des Moines, Iowa 50265, or by calling (515) 224-1995. ◘

CMC heralds its ISDN PRI adapter as VMEbus first

By Susan Breidenbach
West Coast Bureau Chief

SANTA BARBARA, Calif. — Communication Machinery Corp. (CMC) recently announced an Integrated Services Digital Network Primary Rate Interface (PRI) adapter for systems based on the industry-standard VMEbus architecture.

Said to be the first ISDN PRI for the VMEbus, the CMC-1800 can be used to connect Unix workstations and hosts to public or private networks that comply with the ISDN standards set by the Consultative Committee on International Telephony and Telegraphy. It also supports links to T-1 or European T-1 (E-1) transmission facilities.

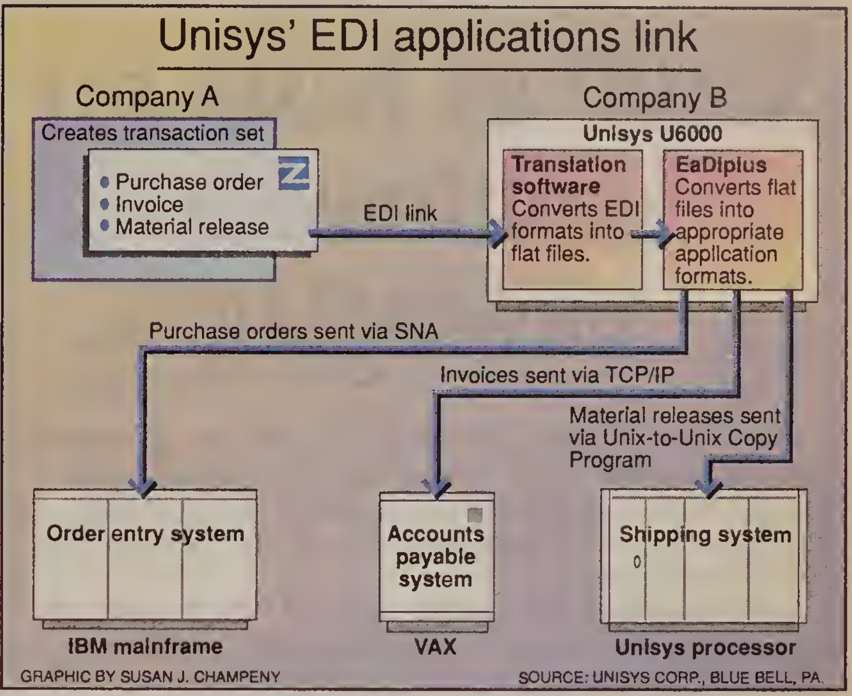
Additionally, the board has a daughterboard connector that customers can use to add more interfaces, such as V.35, RS-422 or Ethernet. This flexible design allows for the creation of complex wide-area networks linking a variety of local-area networks via a mixture of ISDN, T-1, fractional T-1 and E-1 connections.

"This is a new product area for CMC," said Richard Simonson, ISDN marketing manager for the company. He said the board is the first fruit of CMC's 1988 merger with Rockwell International Corp.

According to CMC, the adapter is a channelized PRI that can be used as a foundation for LAN bridges, hyperchannel video applications, terminal concentrators, X.25 packet switches, fast packet and frame relay switches, and other applications currently operating over slower data links.

As required by the ISDN PRI specification, the CMC-1800 pro-

(continued on page 59)



Unisys' EDI applications link

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: UNISYS CORP., BLUE BELL, PA.

Unisys unwraps EDI link to applications

EaDIplus software converts EDI files for use by business applications running on various hosts.

By Wayne Eckerson
Senior Writer

BLUE BELL, Pa. — Unisys Corp. recently introduced Unix-based software that enables companies to integrate data from EDI transactions into business applications running on different systems.

Called Easy access Data Interchange plus (EaDIplus), the software spares users from having to modify host applications to support electronic data interchange formats or manually key in data received via EDI into business applications, such as order entry or shipping systems.

For instance, this enables users to load data from EDI purchase orders directly into a host-based order processing application.

Running on Unisys U6000 processors — which range in size from supermicrocomputers to mainframes — EaDIplus acts as an EDI gateway to applications running in multiple host environments.

The software supports links to hosts running IBM's Systems Network Architecture, Transmission Control Protocol/Internet Protocol, Unix-to-Unix Copy Program, Unisys Uniscope, Unisys Poll Select and Locus Computing Corp.'s Merge 386 protocols (see graphic).

Used in tandem with EDI translation software, EaDIplus automatically reformats EDI transactions from customers and suppliers so they are compatible with internal applications, enabling the data to be imported directly into those applications.

The product also converts outgoing business documents, such as purchase orders and invoices, into the appropriate EDI formats for transmission to trading partners.

EDI translation software, which typically resides on host processors, converts incoming EDI documents into flat files — such as ASCII or EBCDIC — and conversely reformats flat files into EDI formats, such as the ANSI X12 standard, for transmission to trading partners.

Companies can create an EDI gateway or front end to internal applications by running both EaDIplus and EDI translation software on a U6000 processor.

This setup provides additional data security because it off-loads the EDI conversion onto a separate processor instead of running it on an application processor. An EDI gateway keeps trading partners or other outsiders from dialing directly into host computers, where they can gain access to valuable data.

Pluses of EaDIplus

One feature EaDIplus offers is the ability to convert data fields, such as product identification codes, from one trading partner's system to another. EaDIplus comes with data conversion tables that contain equivalent fields or codes for up to five companies.

As a result, EaDIplus can convert data fields automatically while performing data mapping so that trading partners only see product codes or other data fields that are used in their company.

Another feature enables users to send or receive files at predetermined intervals. A menu enables users to specify the exact

(continued on page 59)

OPINIONS

E-MAIL

BY JAMES KOBIELUS

X.400 as basis for multimedia messaging

It's no great surprise that the CCITT X.400 Recommendation has penetrated the market sooner than other Open Systems Interconnection application-layer standards. Electronic mail, to which X.400 is chiefly applicable, is a key application in most data networks.

One may take either a narrow or broad view of X.400. The narrow view regards X.400 as simply a specification for transmitting text messages through gateways between previously incompatible public or private E-mail systems. This is, in fact, the way X.400 is used most often.

Viewed more broadly, however, X.400 can serve as the basis for multimedia messaging systems that carry a range of electronic objects in addition to good old E-mail. The X.400 message structure is flexible enough to wrap around facsimile images, digitized voice and executable binary files — indeed, almost anything capable of being digitized. In fact, major industry initiatives to standardize on X.400 as the "envelope" for store-and-forward routing of electronic data interchange and computer-aided design files are under way.

E-mail is not just E-mail anymore. Three trends in particular are driving E-mail's transformation:

> The X.400 message structure is flexible enough to wrap around almost anything.
>
> ▲▲▲

■ **More cargo.** What many E-mail systems refer to as attachments — meaning ASCII-formatted word processing documents — are usually the bulkiest items transmitted.

Under X.400, E-mail will evolve into more of a pure envelope for an expanding cargo of electronic attachments such as text messages, facsimile, optical scanner images and voice mail.

■ **More E-mail slots.** Users have more flexibility to plug into messaging networks than ever before. Almost any terminal can be used to send or receive messages. Gaining acceptance is the groupware concept of embedded E-mail, which enables users to send and receive mail from within any application.

Perhaps equally important, messaging is being built into the very fabric of applications such as EDI, systems performance monitoring and project management systems. These network-smart applications are built around special triggers that automatically send messages to appropriate individuals when certain variables — such as inventory levels, system alerts and task completions — cross designated thresholds.

■ **More processing and delivery options.** The CCITT X.500 directory services standard will ensure transparent addressing and routing across dissimilar E-mail systems. It will also support specialized message processing and delivery by originating and receiving E-mail systems based on domain-defined attributes in the message header.

For example, a corporate comptroller might send branch offices a compound message consisting of a short cover letter and several attachments: a financial spreadsheet with embedded formulas, an optically scanned sheaf of canceled checks and a source-code COBOL program carrying the updated accounts-payable system. The main address would direct this compound message to multifunctional servers that automatically process the individual components according to domain-defined instructions in the header.

Multimedia messaging, a la X.400 and X.500, promises to make E-mail the lifeblood of the enterprise.

Kobielus, a contributing editor to Network World, *is a consultant based in Alexandria, Va.*

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EDITORIAL

Pioneers of strategic systems focus on innovation, not risk

You've heard the old adage: Pioneers are the guys who get the arrows in their backs.

There's some truth to that. Investing a lot of money and manpower in a strategic network application — one designed to give your company an edge over competitors — means taking a risk, leaving yourself open to the guys with bows and arrows.

In a recent story ("Users debate strategic net investments," *NW,* April 23), users talked about gambling on strategic systems. The debate isn't new. But the urgency of the issue has increased with networking's growing importance to U.S. companies.

Opponents argue that it's unwise to invest in strategic applications for a couple of reasons. One, the application may not work out as planned. The hoped-for business advantages may not materialize even after millions of dollars and many man-years of effort have been spent on the project.

Even if the application proves to be a winner, opponents say, it will be quickly copied by rivals and any benefits will be short-lived. Given the easy availability of network technologies, it will be easier and less costly for competitors to clone your system than it was for you to develop it.

But it's not that simple. You can't hope to be a market leader by avoiding risk and following on the heels of ground breakers. And it's not a matter of dollars and cents, because the size of an investment has little to do with the competitive advantage it ultimately provides.

The issue at the heart of this argument is innovation.

Strategic advantage comes from the *innovative* application of network technology to offer new products or services, or to meet the needs of customers more effectively.

If a proposed network application is innovative, if it's designed based on analysis of customer desires and will meet a real market, then it's probably worth the investment. Rivals may not ever be able to make up the market share points and customer loyalty your application wins for you, no matter how quickly they can respond.

Some argue that we're not likely to see many strategic applications in the future. But that's not the case. Sure, there won't be many systems as strategic as the SABRE reservation system. But that's because the *idea* behind SABRE was so strong, not because SABRE cost so much to deploy or had such a big head start.

Today, pioneering users are at work on applications that will give their companies a chance to gain ground on competitors. They're focusing on innovation, rather than worrying about risk and whether others will follow in their footsteps.

OPINIONS

Which architecture is better for distributed computing?

ONC:

By GEOFFREY BAEHR

The Open Software Foundation (OSF) is about to select a distributed computing environment as a key component of its OSF/1 operating system. By selecting Sun Microsystems, Inc.'s Open Network Computing (ONC) technology, OSF has an opportunity to unite the industry behind a common technology, remove the roadblocks to interoperability and spur the development of distributed applications.

The Sun submission consists of the ONC core services — Transport-Independent Remote Procedure Call (TI-RPC) and eXternal Data Representation (XDR) — as well as Sun's Network File System (NFS), a well-known RPC program. As part of its RPC submission, Sun has also recommended Netwise, Inc.'s RPC Tool, a leading multiprotocol, multiplatform compiler that supports the TI-RPC library and is used for the development of distributed applications.

There are compelling technical and business reasons why OSF should choose ONC:

- ONC is the clear market leader. For connectivity among heterogeneous systems, no distributed computing platform comes close to matching the number of installed systems that support ONC. The NFS component of ONC has been licensed to more than 290 organizations, which ship at least 90 implementations that work across all major operating platforms, including MVS, VM, VMS, Unix and DOS. The ONC installed base is estimated at more than one million nodes.

By contrast, Hewlett-Packard Co.'s Network Computing System (NCS) — submitted as part of DEcorum, which consists of a collection of as-yet unintegrated products from IBM, HP, Transarc Corp. and Locus Computing Corp. — cannot claim a fraction of that number.

- There is already widespread support among vendors for ONC. About half the system vendors that ship NFS, an acknowledged industry standard, also support the application program interfaces for the underlying TI-RPC and XDR protocols. This means that software developers can and do write RPC-based distributed applications today that run across a range of platforms, including IBM

(continued on page 56)

Baehr is acting vice-president of distributed systems at Sun Microsystems, Inc.

NCS:

By SAUL MARCUS

The Open Software Foundation (OSF) is now considering the distributed programming and remote procedure call (RPC) component of its OSF/1 distributed computing environment. Hewlett-Packard Co.'s Network Computing System (NCS) is clearly the superior choice because it excels at the task of hiding the complexities introduced by computer nets, one of OSF's most important goals.

Some of the technical advantages that NCS has over Sun Microsystems, Inc.'s Open Network Computing (ONC) are:

- NCS is truly independent of the underlying network transport; ONC is not. Only NCS provides true transport independence and transparency.

Transport independence means that the RPC can run over both connectionless and connection-oriented transports. Transport transparency means that all RPC features work over all transports and that the RPC semantics are identical, regardless of transport.

ONC provides transport transparency — but with restrictions. Use of certain features such as reliability services require explicit customization.

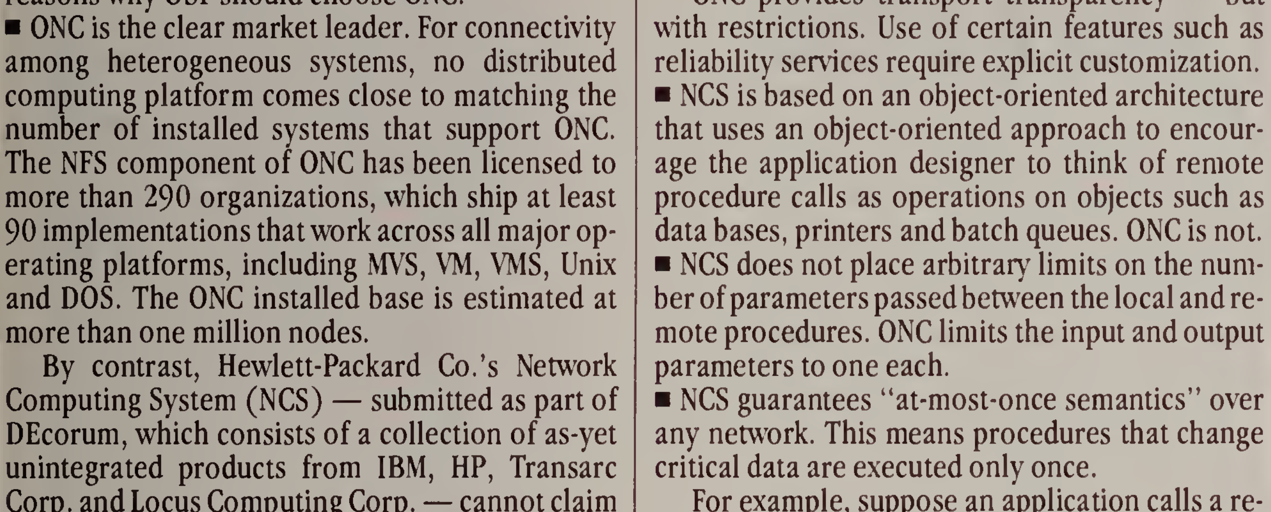
- NCS is based on an object-oriented architecture that uses an object-oriented approach to encourage the application designer to think of remote procedure calls as operations on objects such as data bases, printers and batch queues. ONC is not.
- NCS does not place arbitrary limits on the number of parameters passed between the local and remote procedures. ONC limits the input and output parameters to one each.
- NCS guarantees "at-most-once semantics" over any network. This means procedures that change critical data are executed only once.

For example, suppose an application calls a remote procedure to deduct funds from an account. Should the network fail and later recover, NCS guarantees that the remote procedure to deduct the funds does not inadvertently execute more than once. ONC relies on the underlying network protocol to guarantee at-most-once semantics, a feature not present in all network protocols.

- NCS can run on unreliable transports, and it effi-

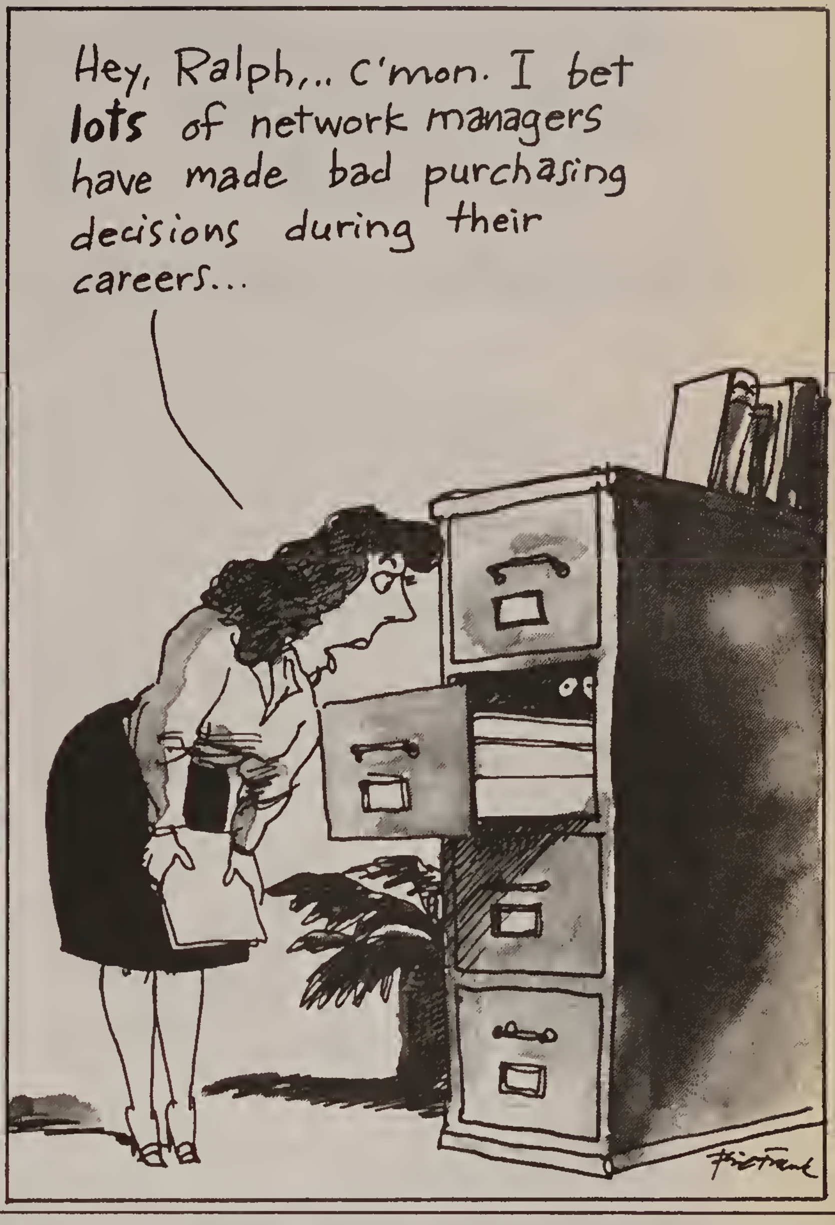
(continued on page 56)

Marcus is Hewlett-Packard Co.'s senior consulting product manager for Network Computing System.



TELETOONS

BY FRANK AND TROISE


Hey, Ralph,.. C'mon. I bet **lots** of network managers have made bad purchasing decisions during their careers...

LETTERS

No middle ground

In my company, there seems to be no middle ground on the subject of Integrated Services Digital Network technology. Whether I bring up the subject in response to a design consideration or just as a lead-in to a "What's the latest in state-of-the-art networking," I always seem to get an opinionated reply.

I've noticed that most of the "old-line" voice and telephone people seem to instinctively shy away from — or even despise — ISDN in any way, shape or form.

One response I heard was: "Integrate voice and data? What for? Who needs it? Who cares? I've been making a perfectly good living selling voice-only PBXs and equipment. Why rock the boat?"

Another person I talked with told me, "ISDN is OK to connect central offices via the Primary Rate Interface, but Basic Rate Interface will never happen. It will never be accepted by the general public like other carrier services such as WATS."

Why is it that in every age, there seem to be people who refuse to see the future and only see the present or the past?

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Network World *welcomes letters from its readers.*

Letters should be typed, double-spaced and sent to Editor, Network World, *161 Worcester Road, Box 9172, Framingham, Mass. 01701.*

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Trends and TECHNOLOGIES RESHAPING networks:

Globalization of networks

Changing of the guard

CONTINUED FROM PAGE 1

developing countries around the world, how and why governments are working in this direction, and what effects their actions may have on local and international telecommunications users. The issues of privatization of telecommunications services in Eastern Europe are examined in the article "A capital question," which begins on page 43.

The definition of privatization varies among countries. However, it is generally acknowledged to be a process or a phase of a process that ultimately leads to transferring control of assets and operations from the central government to the private sector.

Regarding telecommunications specifically, its purpose is the restructuring of a country's telecommunications industry to encourage efficient operations and management, generate an influx of foreign capital to meet the demand for services and technological improvement and provide an important ingredient in developing the overall economy.

Telecom privatization in developing countries will provide many benefits to users, but progress will be gradual.

This privatization process consists of two broad areas of activity that must be viewed together: privatization or commercialization of the telecommunications enterprise itself, and liberalization of the telecommunications industry's regulatory framework and governmental authorization of competing service providers.

Sometimes "commercialization" is the preferred term because "privatization" has different political connotations. The term commercialization actually denotes that phase of the privatization process where the government telecommunications entity is reorganized so that it is managed or at least partially owned by private parties.

Currently, in most developing countries, the telecommunications entity — and perhaps even the equipment manufacturing arm — is a monopoly that is owned and operated by the government. Thus, inefficiencies associated with governmental operation and control result in high expansion and operating costs, poor service quality and reliability, and limited service availability.

These characteristics result from the fact that governments typically lack:

- Financial and administrative autonomy.
- Incentives for efficient operations and planning.
- Management authority to attract and retain

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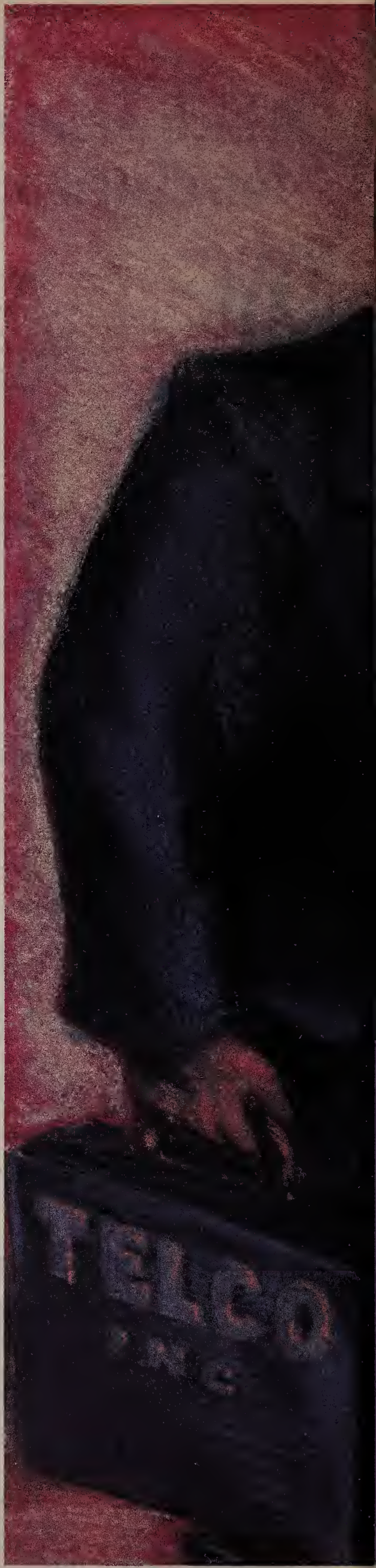
Lerner is president of Transcomm, Inc., an engineering and economics consultancy located in Falls Church, Va.



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(continued from page 38)

highly qualified personnel.

- Management authority to reduce staffing levels.
- Pricing and service flexibility.
- Access to capital markets.
- Political independence.

The intent of privatization is to improve the efficiency, flexibility and energy with which the telecommunications industry operates.

Privatization, however, actually includes a spectrum of changes, from the minor loosening of bureaucratic restraints on government telecommunications departments to the creation of independently managed state-owned corporations and the introduction of private capital to complete private control of operations and asset ownership.

For any given country, reform consists of changing from its current position to one that is more independent and commercialized. Privatization now loosely means any movement in this direction.

Liberalization concerns the organization and regulation of the privatized telecommunications entity and the telecommunications industry as a whole. It involves establishing competitive services and facilities and setting up a government agency that dictates the manner in which prices, profits and financial incentives are controlled.

This second aspect of privatization is an attempt to at least partially replace monopoly regulation with a competitive, efficient, low-cost industry structure that serves all subscriber demands and introduces new services and technologies while avoiding potential monopoly abuse.

Zealous foreign investors and users often overlook this aspect of privatization and, therefore, have unrealistic expectations regarding telecommunications system changes since regulation can severely affect the benefits achieved through privatization.

In reality, the privatization and liberalization process can be stopped at any point along the way to achieving the ultimate objective — complete private sector control and competitive structure. Indeed, several countries have paused to assess the results of partial reorganization and liberalization. Others appear to have stopped the process completely, at least for now.

A common interim situation is one in which the reorganized telecommunications entity's board of directors includes a majority of private sector personnel, even though the government retains control in order to protect what it views as a strategic or national interest. Mexico is currently in this situation.

Great expectations

The global telecommunications environment has changed dramatically in recent years and will continue to do so for some time to come. However, these changes are not occurring equally among countries and are creating enormous pressure for change in developing countries and their telecommunications sectors.

- Low-cost telecommunications and computer technologies are increasing the feasibility of competition for services and facilities, including resale, sharing and bypass.

In addition, low-cost technologies are making telecommunications systems in certain countries obsolete and are facilitating an increasingly integrated global economic system for the short-term economic benefit of the more developed countries.

- Competitive telecommunications policies of certain industrialized and newly industrialized countries are contributing to economic growth. In so doing, however, they erode the developing countries' revenues from international telecommunications agreements and profitable international and domestic telecommunications services.
- Business users in developing countries, unable to compete effectively in the expanding world market, are getting frustrated with deficient services and the inability to implement their own private networks.

Thus, developing and newly industrialized countries are pressured to consider their telecommunications systems not just as noncommercial, static public utilities, but rather as critical, dynamic tools for social and economic improvement. A flow chart

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TECHNOLOGY THE WORLD CALLS ON

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of these relationships is shown in Figure 1 on this page.

Traditionally, the reasons for favoring a government-run telecommunications monopoly have been to:

- Obtain the economies of scale inherent in telecommunications systems.
- Take advantage of the system's profitability in some areas to subsidize nationwide service and other government operations.
- Retain control of an important infrastructure for political, social, economic and defense purposes.

Unfortunately, these traditional benefits of a monopoly system cannot offset the current difficulties countries face in trying to upgrade their systems, stabilize their economic position and stimulate their overall economic growth. Problems result because:

- A government-run monopoly is often inflexible, subject to political interference and has no incentive to provide efficient operations, quality service or responsiveness to customer needs.
- The basic telecommunications network does not completely penetrate the country's geographic areas and probably won't do so without subsidization or special financial arrangements.
- Government budgetary problems not only limit investment in the telecommunications system, but may also divert system earnings to other sectors.
- Domestic and foreign exchange-based financial resources are scarce, limiting investment in any of the country's industries. Combined with the underdeveloped infrastructure, the effect is that economic and social improvement is stifled.

Some policymakers perceive privatization/liberalization as a mechanism to replace government obligations with private investment and management expertise, thereby relieving themselves of the blame for system deficiencies, risk of innovative services and risk of facilities obsolescence. These are the minimal objectives of privatization.

However, more enlightened countries have a broader perspective and are aggressively pursuing the more effective and beneficial aspects of private sector control and competition.

These include improvement in the telecommunications sector, which supports economic progress in other industrial sectors and promotes overall social welfare. Several specific benefits of such policies are itemized in Figure 2 on this page.

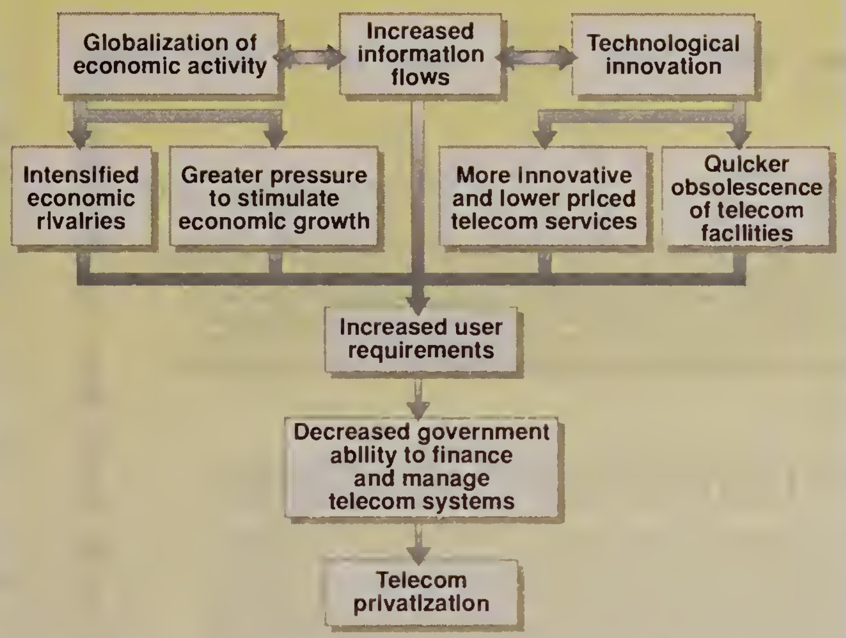
The worldwide trend

The trend toward telecommunications privatization and liberalization is unrelenting and pervasive in industrialized and developing countries worldwide. Nevertheless, this trend has a focus in each geographic region. Argentina, Chile and Mexico are the most aggressive in Latin America; India, Malaysia and Thailand in Asia; perhaps Egypt and Morocco in Africa.

The process in any one country depends upon the state of economic development, the current status of the country's telecommunications network and governmental policies. Only the government's perspective of how these privatization and liberalization factors impinge on its national interests, coupled with its technological and economic status, dictate its progress.

Major factors forcing telecom privatization

Figure 1


Globalization of economic activity
Increased information flows
Technological innovation
Intensified economic rivalries
Greater pressure to stimulate economic growth
More innovative and lower priced telecom services
Quicker obsolescence of telecom facilities
Increased user requirements
Decreased government ability to finance and manage telecom systems
Telecom privatization

Global economic activity, increased information flow and technological innovation lead to privatization and commercialization. Any one of these factors, or any combination, provides the impetus for change.

GRAPHIC BY SUSAN SLATER SOURCE: TRANSCOMM, INC., FALLS CHURCH, VA.

The major trade-off for a developing country is the expected general benefits of privatization and liberalization vs. retaining control of a homogeneous national network for the sake of national security, domestic service expansion and revenue considerations. For many developing countries, maintaining a homogeneous national network is believed to be the basis for subsidizing, via telecommunications rates, expansion into underdeveloped geographic areas.

Indeed, this is how the industrialized nations established their networks, albeit in simpler, less challenging times.

At the same time, policymakers could believe that private organizations within the country would be unable to mobilize resources or would not have adequate demand for full-scale privatization/liberalization work. The lack of business community response to acquiring proposed privatized companies in Argentina fuels this perception.

Aside from government budget and management difficulties, sensitive political and military concerns — such as near-term losses, transfer of national "patrimony" to foreign speculators, protection of domestic manufacturing or defense interests — affect the privatization choices.

Policymakers in developing countries are forced into a delicate balancing act: near-term political and economic concerns vs. long-term economic growth. Resolution of all concerns within the overall economic and political objectives will not be an easy or quickly completed set of tasks. Privatization is an interactive, evolutionary process that must proceed slowly and deliberately.

Unfortunately, few developing countries are equipped to address the broad policy and regulatory issues that, until recently, were relatively unimportant. Many are not even fully aware of all the issues or implications.

Benefits of telecom privatization

Figure 2

• Moving control away from government •

- Greater management flexibility
- Ability to retain sector earnings for reinvestment
- Less political intervention
- More innovative financial and investment strategies
- Greater ability to attract domestic and foreign capital
- Greater management incentive to operate efficiently
- Greater management incentive to provide additional basic and specialized services
- Greater management incentive to develop national pricing and service policies
- Better access to technological and management expertise (from foreign investors)

• Increasing competition •

- Increased efficiency, customer service and innovation
- Availability of additional investment resources
- More new business opportunities in country
- Relieve monopoly provider to concentrate on specific basic service infrastructure requirements
- Restrain monopoly service provider from abusing subscribers
- More reliance on competitive forces and less need to regulate sector
- Less political intervention

GRAPHIC BY SUSAN SLATER SOURCE: TRANSCOMM, INC., FALLS CHURCH, VA.

Moreover, effective means of developing telecommunications sector policy are not often in place. Responsibility for policy and regulation may even be vested within the monopoly entities themselves.

For example, the chairman of the board of Telefonos de Mexico S.A. (TelMex), Mexico's dominant domestic carrier, is also the Minister of Communications and Transportation, thus requiring that a separate regulatory authority be established before TelMex can be privatized.

In addition, certain political elements in various countries are discouraging the overwhelming changes brought on by telecommunications privatization and liberalization.

Thus, the first logical step in the process will be for governments to establish policy-making and regulatory capabilities separate from both the operating entities and not subject to undue political influences.

The typical developing country's next step will be commercialization of its domestic systems in order to acquire some management and operational efficiencies in addition to some much needed outside capital. But for some time to come, countries will likely be unwilling to eliminate the effective monopoly on domestic and international telephone services. Accordingly, most developing and newly industrialized countries will probably not permit competition for basic telephone service, however defined.

Those segments of the telecommunications industry most likely to become competitive include: customer premises equipment; value-added services that require special switching but use monopoly-provided transmission lines; and services such as paging that require special facilities.

In some cases, private business networks may also be authorized principally to ease demand on public networks and to attract to the country or retain important industrial activities.

Becoming increasingly popular is the Buy-Operate-Transfer option whereby a foreign investor buys the communications equipment, sets it up in a developing country, operates it and then, after a predetermined number of years, sells it to the developing country. Such an option is currently being considered in Indonesia.

Finally, even with some privatization and competitive services, the role of government regulation, taxation and trade policies will likely remain an important feature of sector investment and planning, affecting the results of any privatization/liberalization options that a country chooses.

What can users expect?

Some privatization and liberalization benefits telecommunications users can expect are demonstrated by examples from industrialized countries, such as the U.S. and the U.K., which are further along in the process.

In both countries — which already had fairly sophisticated telecommunications systems before privatization began — the governments recognized the importance of the convergence of communications and computer technologies, with their associated lower costs and greater usefulness.

They also realized the importance of the increasing dependence of economic activity on telecommunications and computer advances. Thus, rather than force greater integration and improvement through more centralized control, both countries opted for privatization and liberalization, relying on competitive forces and private business management to achieve a better telecommunications system.

Although British users may not have experienced the full benefits of privatization yet, improvements are apparent in both countries:

- The domestic and overseas nets are incorporating the newest and lowest cost technology.
- Service and marketing innovations are being quickly introduced.
- Users have a wider choice of equipment and services.
- Equipment and service prices are lower.
- Competitive suppliers are more responsive and flexible to specific user requirements.

Of course, all of these improvements mean users may also have more difficulty making decisions. The roles of network managers and integrators have therefore become more important within the corporation.

Because privatization and liberalization progress will be slower and less extensive in newly industrialized and developing countries and because their overall system development is farther behind, expected improvements will be far more moderate, depending on the options these countries choose.

Expectations include improved basic monopoly service, expansion of basic monopoly service to rural areas, a wider range of equipment choices and eventual availability of value-added and

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Trends and TECHNOLOGIES RESHAPING networks:

Globalization of networks

A capital question

By ALAN PEARCE

Will the telecommunications and information industry in Eastern Europe become privatized in the 1990s? If so, how will it be accomplished and where will the capital come from? What are the challenges and opportunities for multinational telecommunications network managers? Will the so-called "liberal" revolution make things easier for users of the global and ubiquitous switched network?

These questions are being asked as Eastern Europe's communist, totalitarian dictatorships fall one by one in a rush to embrace democracy and the free market.

For the past 50 years, the economies of most Eastern European countries have been state-owned and -controlled. Today, the problem of reintroducing a free market economy catering to stockholders and users may prove to be more daunting than having free elections in a multiparty political environment.

The telecommunications and information industry, which played a vital role in the trend to-

(continued on page 47)

Pearce is president of Information Age Economics, a telecommunications research firm in Washington, D.C.

Eastern European telecommunications seems to be in for a change of pace, but difficulties in setting up capitalist economies could short-circuit modernization efforts.

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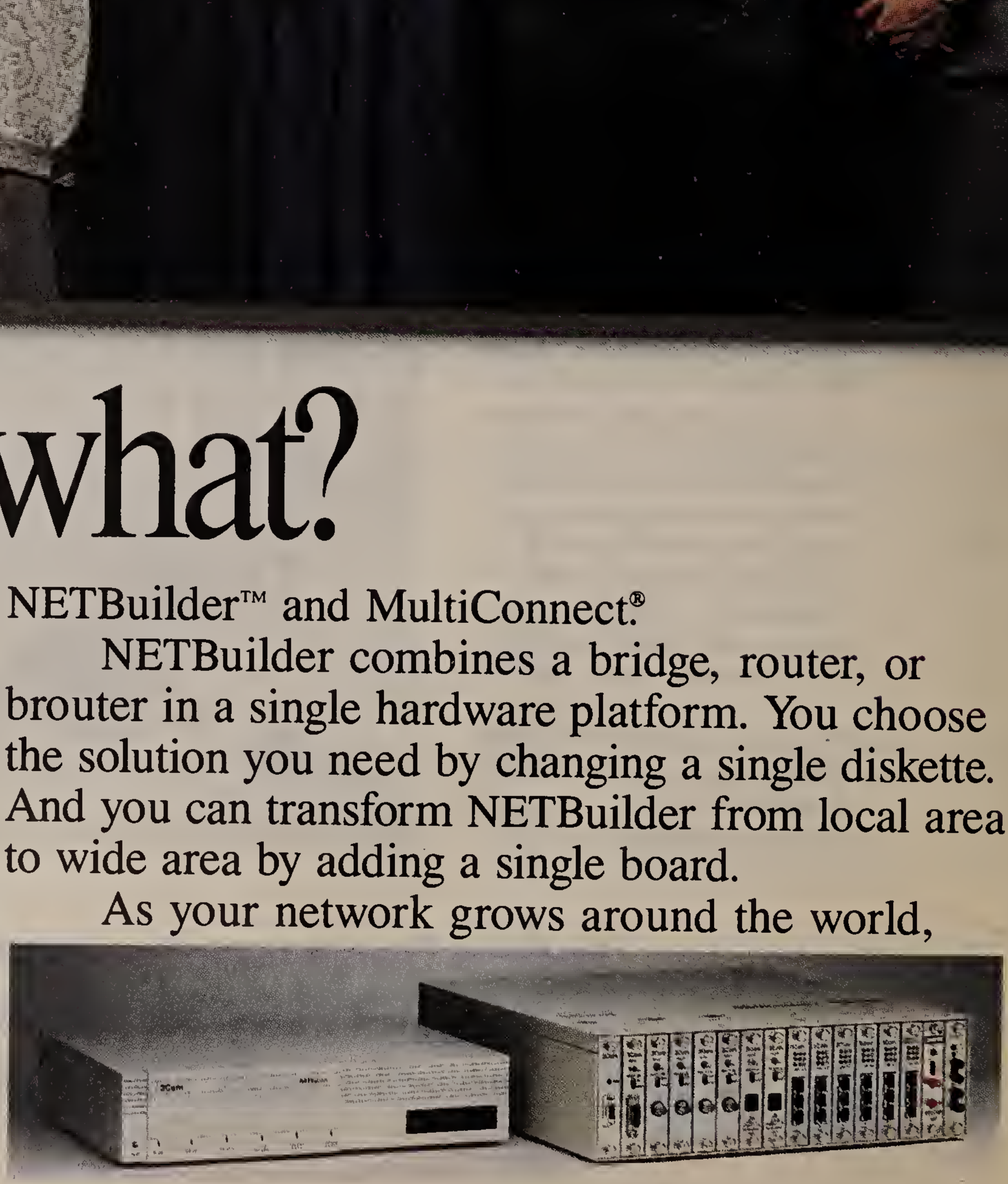

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(continued from page 43)

ward democracy and free markets in the Communist Bloc, may be the first to experience privatization and a desire to serve major business users, a group that has been almost totally ignored in the past.

The countries of Eastern Europe are painfully aware that they are way behind the West in developing sophisticated, user-friendly telecommunications and information infrastructures that will prove vital to economic and business development while contributing to the creation of lasting democratic governments.

Unfortunately, problems abound. The people of Eastern Europe have no capital with which to buy privatized telecommunications systems from their governments. There is a dire shortage of money for the necessary upgrading of systems. In addition, each country must develop a successful privatization plan.

Eastern European telecom

The telecommunications industries in Bulgaria, Czechoslovakia, East Germany, Hungary, Poland, the Soviet Union and Yugoslavia are in almost total disarray. Telephone penetration is extremely low, except in East Germany, and universal service is just a dream.

While in the U.S., about 95% of all households have a telephone, the percentage in East Germany is just less than 50%, which in turn is way ahead of its Eastern European partners in the Warsaw Pact, according to the United States Telephone Association and the World Bank. In the Soviet Union, only about one in four families even has access to a telephone.

Poland and the other countries are even worse. According to Janice Obuchowski, assistant secretary of commerce for telecommunications and information, "Telephone penetration in Poland is 10% in urban areas and only 1% in rural areas. The call completion rate is 30%. The Poles are particularly interested in buying central office switching equipment, cellular equipment and packet-switching equipment."

Between now and 2000, the Eastern Bloc countries need to spend as much as $140 billion on telecommunications equipment.

The problem is how to pay for this modernization. The answer, it appears, includes privatization, partnerships with foreign service providers and equipment manufacturers, and loans from multinational banks and Western governments.

The push toward modernization and privatization is spurred by a desire to serve domestic and international business users more effectively with more efficient telecommunications services. In the long run, multinational business enterprises will pay for — and benefit from — the upgrades by dramatically increasing their use of the global and ubiquitous telecommunications network. In other words, the business user is regarded as a prime mover of modernization and will play a vital role in its execution and success.

> Between now and 2000, the Eastern Bloc countries need to spend as much as $140 billion on telecommunications equipment.
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Privatization difficulties

The Eastern European countries have no experience with privatization of the telecommunications and information infrastructure and have inexperienced capital markets and no stock exchanges. Some of the problems they face are:

- **Massive redundancy and overmanning.** Full employment is national policy. There is no such thing as unemployment insurance, and severe constraints prevent workers from moving from one job to another.

Redundancy and overmanning create major inefficiencies and increase costs; consequently, Eastern European telecommunications systems are uneconomical and noncompetitive with telecommunications service providers in the West. This creates a fear that telecommunications traffic and information age services will be handled by "foreign capitalists" who threaten to undermine the evolving economic, social and political fabric of the emerging democracies in the East.

- **Technological backwardness.** The telecommunications and information industry is clearly dominated by Japan, North America and Western Europe. The Eastern Europeans believe they must rely heavily on the West for the upgrades, thus perhaps worsening — at least in the short term — their balance of payments and foreign debt problems, which are already severe.
- **Management shortages.** Eastern Europe has a severe shortage of highly trained technocrats and business managers to handle the transition of the telecommunications and information industry from inefficient to reliable.
- **Lack of capital.** As telecommunications moves from public to private ownership, there is a question concerning the source of the capital. Generally speaking, ordinary citizens of Eastern Europe do not have money to invest in a privatized telecommunications entity. The capital markets are in the West and Asia. The people of Eastern Europe do not want their high-tech industries and service sectors to be foreign owned and dominated.
- **Debt.** Eastern Bloc countries may not be able to take on much new debt from the West. Western banks are already dealing with the debt repayment problems of Latin American and Third World countries, which could be exacerbated by debt problems in Eastern Europe. Consequently, it is still questionable whether Western banks will be able or willing to finance either the privatization or the upgrading of the Eastern Bloc's telecommunications systems.

The British model

Great Britain provides Eastern Europe with a model of how to successfully achieve privatization. When British Telecommunications PLC was privatized 10 years ago, it almost immediately began to serve its major customers in ways never before thought possible.

British Telecom had been a state-owned enterprise from its very beginning and, for many years, had been an integral part of the British Post Office. In privatizing British Telecom, Prime Minister Margaret Thatcher hoped to make it more competitive and more responsive to its customers and to the market. Because the British government was privatizing a monopoly, very little changed in the management of the company, other than to remove political interference and replace it with a regulatory regime.

During the debate on privatization, the Thatcher government made a number of concessions, including:

- A director general of an office of telecommunications would be appointed to regulate British Telecom in the public interest. The Office of Telecommunications would be similar to the Federal Communications Commission in the U.S.
- British Telecom would have to submit to a price cap proposal linked to the retail price index minus some kind of productivity factor. In other words, the retail price index minus a number to be determined by the director general would be the price of basic telephone service. In fact, the price of basic services had to be reduced in real terms over a five-year period. This was price regulation, as opposed to rate-of-return or profit regulation, which is practiced in the U.S.

This price reduction, in fact, spurred the rapid growth of British Telecom's revenues by increasing the demand for telephone services. In the U.K., local exchange service had been priced high because it was assumed that only rich people could afford telephone service.

Consequently, the high revenues derived from telephone service were used to subsidize the postal service, which was presumed to be used mostly by the poor.

Once British Telecom was privatized and telephone service prices were reduced, the demand for service rose dramatically, more lines were installed and higher revenues were generated. The result was a dramatic increase in the price of British Telecom stock.

- A limited form of competition was created. Mercury Communications, Ltd., a joint venture of Cable & Wireless PLC, British Petroleum Co. PLC, and Barclays Bank PLC, was set up to compete with British Telecom. Mercury now has a very small share of the British telecommunications market, so the British essentially have a regulated duopoly where the regulator can introduce new competitors in the event that British Telecom and Mercury do not behave themselves. This threat of further competition is used to keep both British Telecom and Mercury in line.

> A nationalized company does not fear regulation or competition and, therefore, does not have any incentive to perform well.
>
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Clearly, a nationalized company, which is what British Telecom was before privatization, does not fear regulation or the threat of competition and, therefore, does not have any incentive to perform well. Consequently, users' needs are often ignored.

During the privatization process, the British experienced some difficulties concerning stock ownership. Prior to the privatization of British Telecom, the British did not have a tradition of broad stock ownership, as does the U.S. But unlike the Eastern Bloc countries, Britain did have a highly sophisticated capital market.

Thatcher, taking a lesson from the U.S., attempted to create a broadly based distribution of shares in British Telecom to make it impossible for a future government to renationalize it. British Telecom was, in fact, oversubscribed, which is perhaps an indication that it was underpriced.

Thatcher imposed ownership quotas on institutions, foreigners and certain other groups. She rationed shares, and the share distribution was deliberately skewed to maximize the number of shareholders. Institutional equity owners dominate the stock market in the U.K., as they do in the U.S., but they were limited in their ownership of British Telecom. Another critical component was the fact that the shares were freely transferable and liquid.

As a consequence of the Thatcher plan, British Telecom is more efficient and better regulated than in the past because every day, shareowners can read the share prices of the company. When a nationalized company makes a mistake, very few people know about it. If a company such as British Telecom makes a mistake, the stock price may take a 15 point dive and everyone would know that something is amiss.

The privatization of British Telecom has been a phenomenal success. The British Government was able to sell the company and use the money to finance tax cuts while creating a fairly efficient and reasonably well-regulated company that is now successfully expanding overseas.

Benefits and risks

Users of the global telecommunications network are beginning to demand better services from the Eastern Bloc. Privatization may help that process along, especially since better services are one of the cornerstones of economic development. There is a desperate need to upgrade the management and the service quality as soon as possible, and multinational network managers can play a leading role in this because they have an expertise that they can share.

Other potential benefits of privatization include:

- Interconnectivity of data, voice and video communications between East and West, which will enable business users to function much more efficiently and increase global economic activity and prosperity.
- Improved reliability and interoperability of the telecommunications infrastructure in the Eastern Bloc.
- Closer cooperation among the telecommunications service providers, not only in Eastern Europe, but also in other parts of the world.

(continued on page 56)

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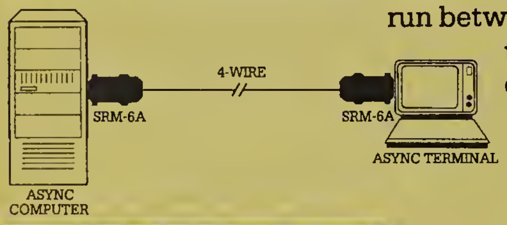

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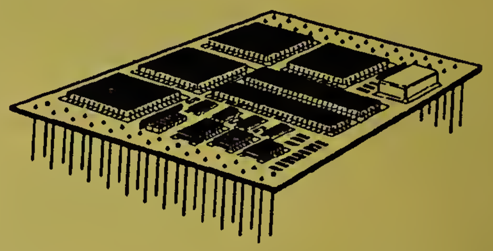

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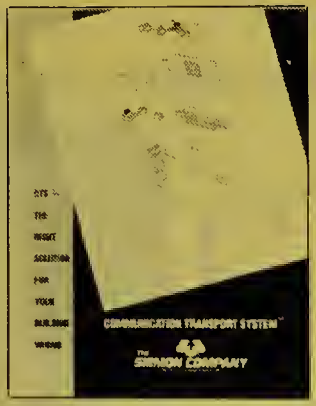

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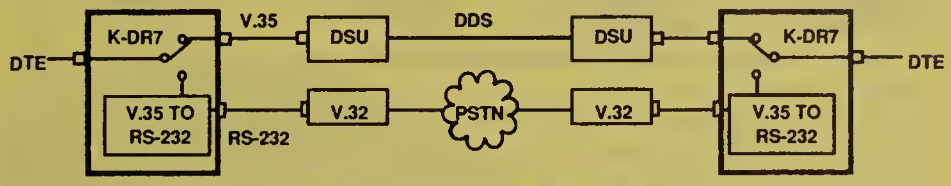

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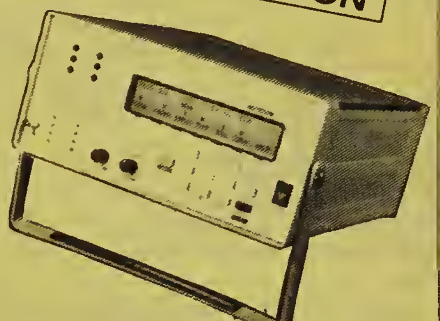

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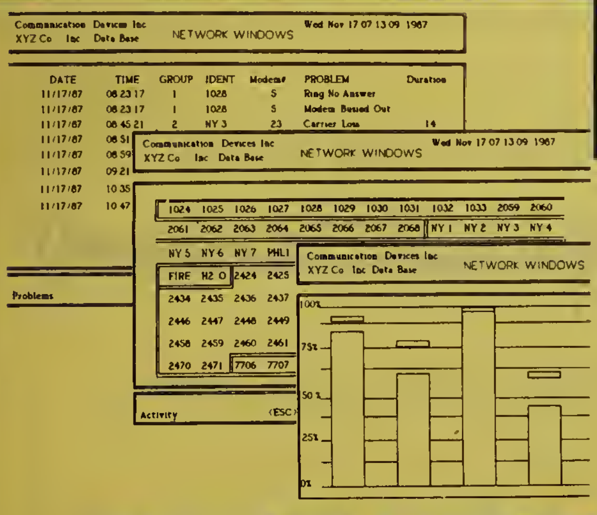

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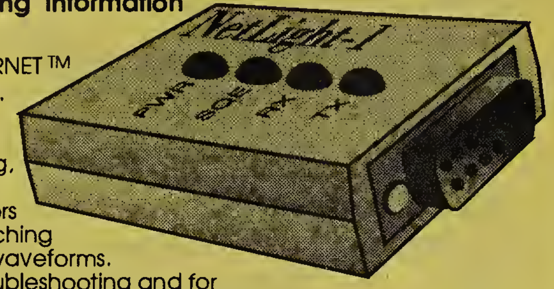

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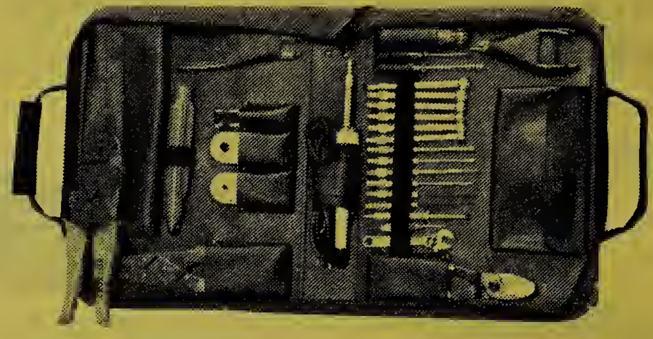

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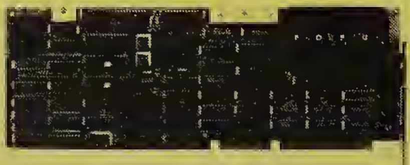

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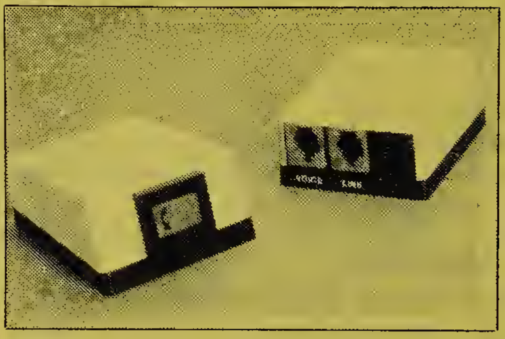

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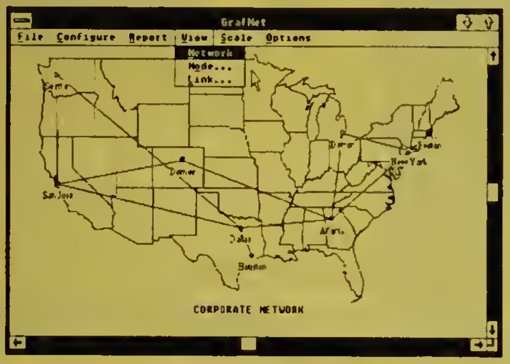

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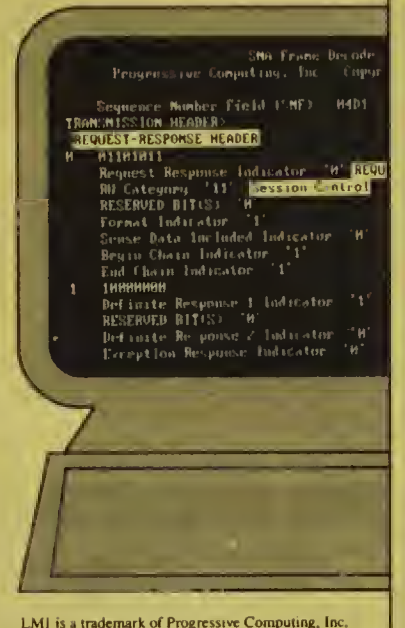

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    RESERVED BIT(S)  '0'
    Format Indicator  '1'
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    End Chain Indicator  '1'
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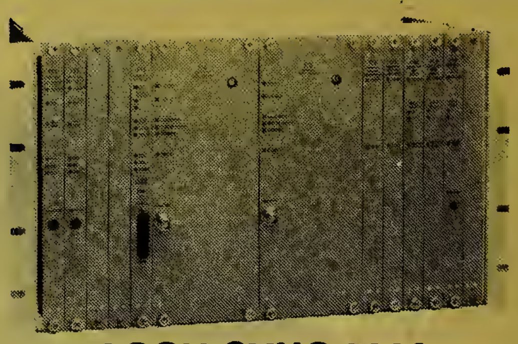

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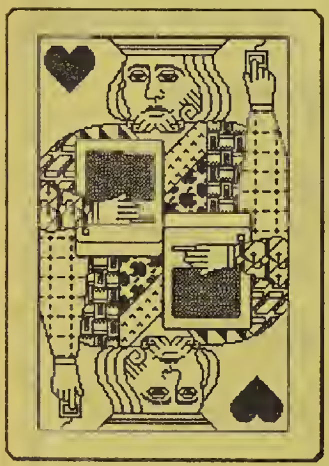

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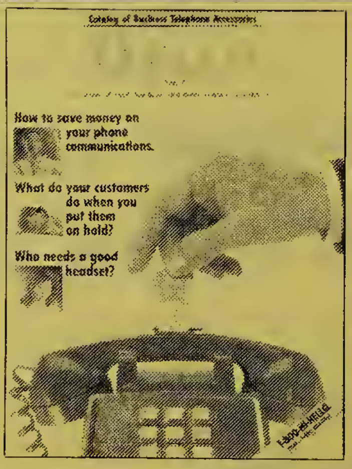

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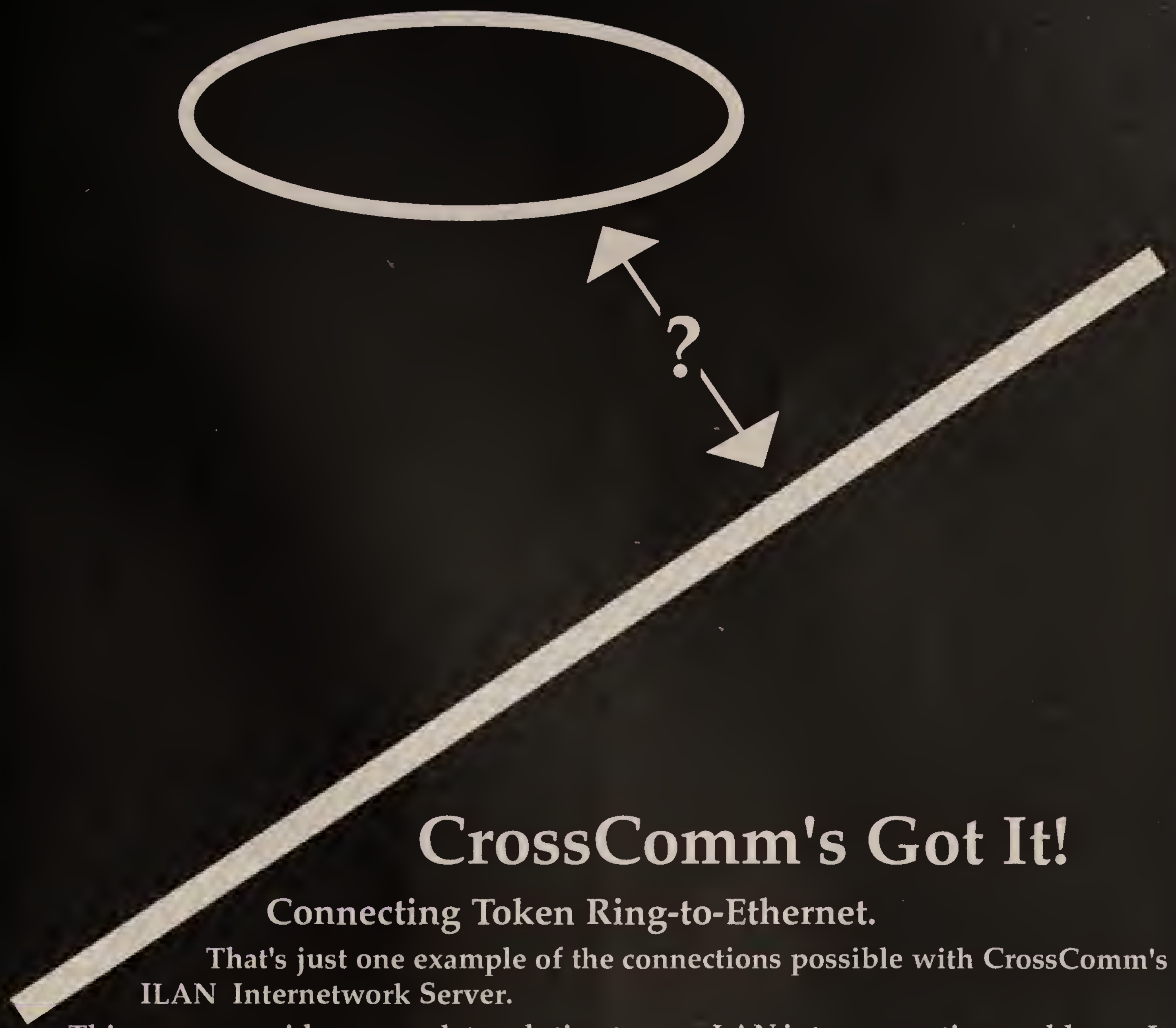

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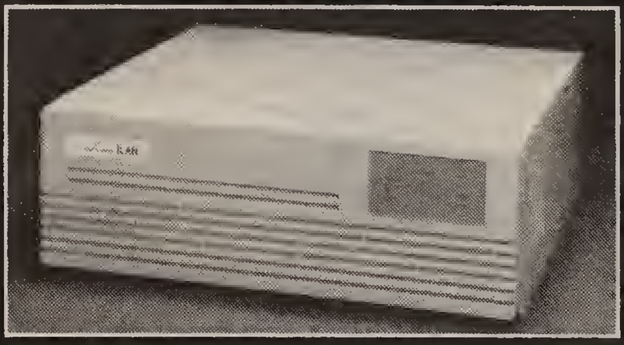

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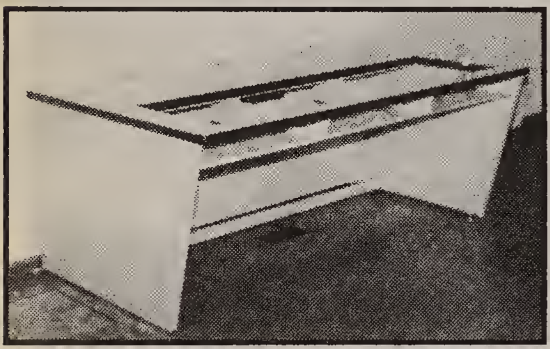

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A capital question

continued from page 47

- A reduction in the prices of services to attract greater use of upgraded networks owned by the newly privatized systems.
- Greater availability of equipment and easier interconnection with the network.
- Reduced government interference in telecommunications and greater sensitivity to user problems and user solutions.

Clearly, all of the above issues and potential benefits will be assisted not only by privatization but also by the joint ventures between Eastern European and Western companies that are springing up almost daily.

However, privatization also involves some risks. There is always the threat of expropriation in Eastern Europe. Multinationals thrive on economic and political stability. Business deals struck today could change dramatically some time in the future if the trend toward democracy and free enterprise comes to a crashing halt — especially if cross-border data and information flows die.

Other privatization risks include:

- Potential problems in buying or leasing equipment in Eastern Europe. The privatized entities may still wish to maintain some stringent controls over connections to the public switched network. Modern business users are now accustomed to being able to come up with their own solutions, free from either government or service provider interference.
- Loan repayment. What happens to the Western banking system if the Eastern Bloc countries cannot repay the heavy loans? Banking and telecommunications services are inextricably intertwined, so any failure to repay loans could result in failures in the telecommunications infrastructure as well as its interconnectivity and ubiquity.
- Lack of trained personnel to manage and operate the telecommunications systems. How and when will this gap be plugged?
- Stringent Western rules against the export to the Eastern Bloc of defense-sensitive products and services, including telecommunications. If these rules are not changed soon, users will not be able to reap the potential rewards of upgraded systems in the Eastern Bloc. Obuchowski of the Department of Commerce suggests that U.S. export control laws could be liberalized to facilitate doing business with the Eastern Bloc.
- Eastern Bloc countries have had almost no entrepreneurial tradition for the past 50 years. In addition, cultural, political and economic roadblocks prevent the early adoption of efficient business practices. In Eastern Europe there has been hardly any focus on how to serve major business users with telecommunications equipment and services. This must change — and soon.
- Lack of capital markets and stock markets in the Eastern Bloc. Capital formation and the selling of stocks and shares will be difficult in the early years, hampering private enterprise and slowing down user-sensitive solutions.
- Inflation. Because the economies are at or near collapse, there is a great danger of rapid inflation. Inflation increases the risk factors for Western businesses and users wanting to do business in Eastern Europe.
- Income inequality. If some economies boom and others go bust, this may create further political problems and instability. Political and economic instability add to business risks for the multinational business users of the telecommunications network.

As for the future

Recent happenings in Eastern Europe — the collapse of communism and the emergence of democracy, with a limited form of free market business enterprise, is promising. But there is no reason for hardheaded businesspeople to become euphoric just yet.

The initial progress toward changing the economies of Eastern Europe should be left to their own governments. Only then, with the assistance of the governments of Western countries, should Western businesspeople begin to discuss joint ventures and business deals over the longer term.

The privatization of nationally held companies takes time. Nationalized entities are grotesquely inefficient; much needs to be done to bring them up to date. Users of telecommunications services will benefit, however, over the next few years as the privatized Eastern European entities become more efficient, effective and user-friendly.

Changing of the guard

continued from page 41

special services from private suppliers. Beyond that, the expected economic growth and social improvement should benefit users tremendously. All these benefits, however, are expected over the longer term.

It is also expected that progress will not proceed in a linear fashion, nor will it be quick or even consistent.

Even after a national policy has been established, the flux in national and international conditions will require refinement and reorientation.

For most developing countries, and even for some industrialized nations, the process will take place but will be evolutionary in nature. Full, unrestricted competition within the telecommunications sector will likely be far in the future, if ever, even for some industrialized countries.

A long time coming

Privatization and liberalization of the telecommunications industry is a rapidly growing trend spurred by technology advances and global economic pressures. Developing countries will ultimately be forced to participate in the privatization and liberalization process, but their participation will probably lag behind that of industrialized nations.

Privatization and liberalization will generate substantial improvements in the telecommunications sector, which will contribute to overall economic and social development. Within the process, telecommunications users can expect improvements in basic services and some access to enhanced services as well.

The timing and extent of these benefits will vary by country, however. For many users, they may be a long time in coming.

ONC

continued from page 37

mainframes, Digital Equipment Corp. VAX systems, Unix-based workstations and DOS-based personal computers.

Choosing ONC will enable OSF to protect users' investments and build on this existing base.

- By supporting ONC, OSF can unite both Unix camps and all major personal computer local-area network vendors. ONC is shipped as a core component of AT&T's System V Release 4, the industry's leading version of Unix, which is supported by Unix International, Inc.

In addition, Banyan Systems, Inc., Novell, Inc. and 3Com Corp., the major personal computer LAN vendors, will support future releases of TI-RPC.

Software developers are also vitally interested in seeing a standard RPC emerge.

- ONC is portable and scalable. It is available for all major operating systems and runs on everything from a personal computer to a Cray Research, Inc. supercomputer. NCS has not proven workable on anything other than Unix workstations.
- ONC is modular. The TI-RPC platform can support any number of services. It supports several directory systems, for example. TI-RPC was easily integrated with AT&T's Transport Layer Interface, creating a protocol-independent RPC that allows a single binary version of an RPC program to run across any network transport without changing the on-the-wire RPC protocol.

Sun deliberately submitted only the core ONC services — TI-RPC, XDR and NFS — so that OSF could choose the best high-level technologies from third-party vendors that could be layered on the ONC base platform.

This contrasts with the "kitchen sink" approach of DEcorum. Many of the services included in DEcorum can easily be layered on ONC.

In fact, Sun will take note of OSF's selections for such services as authentication and time synchronization, and may add these capabilities to its ONC offering. In this way, distributed computing technology can advance while building on the installed base as users and software developers demand.

Sun's RPC submission is a general-purpose set of protocols. There may be specific situations where other RPCs might be more appropriate — for instance, for data base access — but these RPCs are not the best solution for all applications.

Such discussions rapidly turn into religious arguments with their own litany of acronyms. Developers and users have no wish to be caught up in the RPC wars. They want the industry to settle on one standard.

Sun, of course, has a clear business interest in OSF selecting ONC. Yet the company has never attempted to "milk" its ONC technology. The TI-RPC and XDR code is, quite literally, given away. No contract or license fees are required.

Also, Sun has a long history of licensing its ONC and NFS technologies with very reasonable conditions. By choosing ONC, OSF could join the ranks of several successful ONC and NFS master distributors.

The ONC platform is too well-established to be replaced by another distributed computing environment. Neither Unix International nor the personal computer LAN vendors will back away from ONC support.

OSF can choose to unite the industry, or it can attempt to establish a second standard, an option that will cost system vendors, further confuse software developers and delay the trend toward distributed computing.

Many solid arguments favor OSF's choice of ONC. The one hurdle that may be difficult to leap is OSF politics.

NCS

continued from page 37

ciently minimizes the number of messages that need to be exchanged in the course of executing the RPC on an unreliable network. ONC cannot.

- NCS can run reliably over wide-area networks. ONC cannot.
- NCS incorporates bulk data constructs for moving large blocks of data independent of the underlying network transport. ONC does not.
- NCS does *not* require data conversion to a canonical data format between two similar machines. ONC does.
- NCS incorporates a nonproprietary, industry-standard authentication algorithm — the Massachusetts Institute of Technology's Kerberos. ONC does not.
- NCS incorporates asynchronous threads packages. ONC does not.
- NCS takes advantage of broadcast capabilities, an important requirement in certain vertical applications. Broadcast, a service provided in connectionless transports, is an extremely critical service when all clients must have access to the same information at the same time.

For example, in brokerage firms, a server will receive stock and securities quotes from the financial wires. When a price change occurs, it must be broadcast to all brokers and traders simultaneously. ONC does not support broadcast.

- NCS provides consistent, predictable behavior. For example, declarative statements in NCS interface definitions specify data transferred over the network. There is no need to worry about the effects of "customization code" in the interface definition. ONC does not provide consistent, predictable behavior.
- Only NCS supports the notion of a "location broker." The location broker provides a dynamic locating service for locating procedures and network objects.

If a server procedure becomes unavailable on one system, the location broker can automatically assign a replica of the server without any application changes or intervention by the system administrator. ONC includes a statically configured location scheme, dubbed yellow pages, which causes the application to fail if resources or procedures become unavailable.

- NCS is the basis for a broad range of HP Team Computing applications.

Products such as the Network Licensing System, the OmniBack backup and restore system, the Knowledge Broker and the Passwd Etc user account management system are proof of the viability and usefulness of NCS. ONC is principally used only in network file services.

OSF was originally looking for a network in which all of the computing resources would be available to all users without them knowing which system was being accessed, where it was or anything about its operating requirements. That is exactly what NCS does.

OSF will base its decision on the technical merits of the submissions. NCS is clearly the best technical solution in the industry for providing an RPC component. Oh, and by the way, ONC is not.

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DEC describes benefits of X.500

continued from page 1

How will X.500 directory services affect user networks?

In its simplest terms, X.500 provides for two things. One is, if you want to send a message or file to another network object, you provide a destination name, and the service comes back with the technical attributes that describe the network address and the necessary protocols to route it to that location.

That destination doesn't have to be an E-mail mailbox. You can send data to virtually any network object — disks, files, applications or other computers.

X.500 also provides directory search capabilities. If you want to do a name search where you have some of the attributes — like the department a person is in — but you're not sure of the full name, then X.500 finds those things.

What it might be analogous to today in DECnet would be our Distributed Name Services, which provides naming capabilities in DECnet environments, whereas X.500 will do that for OSI nets.

Where is this information stored?

Our X.500 capabilities will use the same name services data base that we have in DNS so that you'll have one data base that will provide services for the OSI users for the storage of those names, as well as for DECnet.

What the X.500 standard doesn't do is describe how you store name structures and their associated routing instructions. It leaves that up to individual [vendor] implementations.

Does a user have the option of using that data base in a centralized or a distributed fashion?

I think that depends entirely on the size of your network. If you have a network that's less than a hundred nodes and you don't foresee that there will be much growth, then you might want to have what we call a flat namespace [or naming directories] with no hierarchy; you just use simple names. You might then also have a central storage point for that.

For a large network, it wouldn't make sense to centralize the data base because the distributed nature of DECnet allows you to partition your namespaces and your directories so that you don't put an undue burden on the server where you're storing it. This allows you to replicate your directory across the different data base servers to improve the performance.

You said X.500 is used not only to name individuals, but also to name objects. Explain why you need to name disks, applications and devices.

Let's say you have a payroll file. In today's environment, the specifications for a lot of those file structures are specific to the point of saying what disk the file is on and what system the file is located on.

Well, let's say you relocate your entire payroll operation out of state, or maybe you merge some operations that may have a different set of disks or different set of systems. You'd have to change those applications to reflect the new location of the files.

But with X.500, you don't necessarily have to go out and change the applications; you just continue to use them in the same way without worrying about where another device is located. The directory service keeps track of where applications and files are relocated.

Another reason to name applications in the directory data base is that applications can be independent of location. You can have part of an application executing on one system and another part of the application running on a different system.

> "I think one of the greatest services you get from any kind of name service, whether it be DNS or X.500, is location independence."

▲▲▲

What benefits does X.500 provide to end users?

I think one of the greatest services you get from any kind of name service, whether it be DNS or X.500, is location independence. For example, in the Digital environment, a user could say, 'I want this file, which exists on this disk, which exists on this system.' Well, if you set up your global namespace and your directory services properly, you can do things logically. You could name a file 'organization.payroll' or 'manufacturing.payroll.'

The user then doesn't care whether it's on a local disk, tape drive, some system in Massachusetts or another system in California. It frees users from all of the costly implementation issues of moves, changes and deletions.

Taking advantage of these distributed naming services also makes it a lot easier to change the location of devices on a factory floor, for instance, so that if you have to retool or move devices, there isn't a tremendous amount of redefining device locations.

Is DEC committed to shipping X.500 along with DECnet Phase V?

Digital is committed to shipping X.500; however, when the first release of Phase V ships, X.500 will not be available. It is planned as a follow-on. We are working very actively to make sure that when we deliver our product, it will be delivered as a full implementation.

We are going to make sure of the interworking between our services and other vendors' X.500 services when we deliver our first product. So I would anticipate that you would see the X.500 product shipped in a relatively short time frame after DECnet Phase V.

When is Phase V scheduled to ship?

Somewhere between July and September 1990. And I would expect X.500 would ship within six months after that.

What type of system will X.500 run on?

The current version of DNS runs on VMS systems, and the release of the X.500 name service provided with DECnet Phase V will run on VMS or Ultrix systems.

Can users do anything now to prepare for the migration to X.500?

Customers who already use DNS and are going to migrate to OSI should consider X.500 constructs, if you will, in building their name data bases. That is, you build the name attributes and the name of the fields according to X.500 standards because the way that X.500 accesses data is just a little bit different than the way DNS does.

But X.500 constructs are allowed in the current DNS service. Although Digital has not developed or provided X.500 services yet, that doesn't prevent customers from using the naming constructs of X.500 in DNS. Then, when we do offer X.500 capabilities, their data base will already be set up to support it.

The other thing I think we're doing to help our users is working to provide end users and software developers with the necessary programmatic interface to build X.500 services into common applications. This will let users purchase a text application, for instance, that has X.500 directory services built in.

What would a user have to do to an application to make it X.500-compliant?

Where an application would construct names, numbers or parameters that must be stored or transmitted across the network, those naming conventions would have to conform to X.500 formats. This would be for any application that produces output that must be stored to a disk.

Basically, if you have an application that gets involved in doing lookups of names or objects, then you set it up so that those lookups support X.500 formats. It's not a terribly difficult task.

Letters

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Even several "techie-types" have commented to me that they see the ISDN PRI as acceptable for central office links but the BRI speeds of 19.2K bit/sec through 64K bit/sec are just too slow to cover the bases for all the technologies that carriers, telephone companies, end users, academics in the university research areas and various manufacturers of personal computer-based technology products are trying to squeeze into ISDN.

There is just not enough bandwidth for all those users and types of applications.

Interestingly enough, I've talked to several nontechnical or semitechnical people who do see ISDN as a technology with a future. These people are varied in their enthusiasm for ISDN but seem to be unbridled in their enthusiasm for its endless possibilities.

To ISDN's nay-sayers, I say "Hogwash!" I see ISDN BRI to the desktop — which will allow integration of voice, data, text, and image and graphical information — to be the real key to success in the networking marketplace in the 1990s and beyond.

Marc Busch
Senior network engineer
Customer support
Contel Corp.
San Diego, Calif.

Unisys unwraps EDI link

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time they want EaDIplus to log on to a specified host and download a file from an application and convert it into the appropriate EDI format for transmission to a supplier or customer.

EaDIplus can also activate an EDI translator to download EDI transactions from a value-added net mailbox so that it can reformat the data and forward it to a company's internal applications.

A third feature of EaDIplus enables it to create a duplicate copy of specified EDI transactions. This is useful for backing up data for financial or security purposes. Users can instruct EaDIplus to store the file to a disk on the U6000 processor or upload it to an application on a processor.

In conjunction with the EaDIplus announcement, Unisys teamed up with EDI, Inc. of Gaithersburg, Md., to unveil a Unix-based EDI translation product that runs on U6000 processors. Called Telink/open systems architecture (Telink/osa), the software supports all X12 EDI standards, representing more than 100 EDI transaction sets.

According to Martin Reber, program development manager at Unisys, Telink/osa and EaDIplus together create a software package that provides users with a turnkey solution to implement EDI in a Unix environment.

The two products have been designed so that each can initiate selected events in the other's software, Reber said. For example, both products can run off the same scheduling utility so they can work in concert to process incoming or outgoing EDI transactions automatically.

EaDIplus will be available in August. Pricing depends on the type of U6000 processor and ranges from $14,000 to $40,000. Telink/osa is priced starting at $9,000 and will be available in third quarter.

Unisys can be reached at P.O. Box 500, Blue Bell, Pa. 19424, or by calling (215) 986-6074. EDI can be reached by writing to 19650 Clubhouse Road, Gaithersburg, Md. 20879, or by calling (301) 670-0811.

CMC heralds its ISDN adapter

continued from page 35

vides one 64K bit/sec D channel plus some mixture of 23 or 30 64K bit/sec B channels and hyperchannels. The latter, designated H10, H11 and H12, are 384K bit/sec, 1.536M bit/sec and 1.92M bit/sec, respectively.

The CMC-1800 has a Motorola, Inc. 68020 coprocessor and 1M byte of 32-bit memory. It can be configured as either a VMEbus master or slave interface. The ISDN protocol software occupies only a small portion of the memory, leaving plenty for customers to add customized vertical applications, the vendor said.

The board delivers data from up to 30 simultaneous B channels to host applications and supports on-board rate adaption or inband protocol processing for all channels.

Host-based call-control software enables applications to control connections established by the adapter. Host driver software for Sun Microsystems Inc.'s SunOS version of Unix, as well as AT&T's Unix System V are included.

In single-unit quantities, the CMC-1800 is priced at $3,995, plus $695 for Release 1.0 of the ISDN PRI software. Initial shipments are scheduled for June.

The CMC-1800 will also be available as part of CMC's ISDN Forerunners Program kit. Priced at $24,995, the package includes two CMC-1800 boards, ISDN PRI software, network emulation software, host interface software, a program interface library, test equipment scripts, cables, documentation, a two-day training class at CMC and 90 days of telephone support.

CMC can be reached by writing to 125 Cremona Drive, Santa Barbara, Calif. 93117, or by calling (800) 262-8023.

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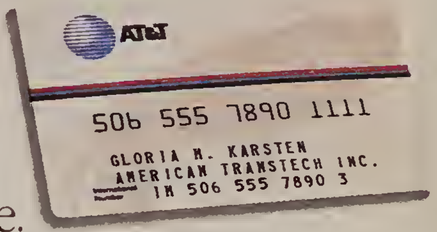

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U.S. to study Soderblom patent

continued from page 1

ing agreements Soderblom has with an estimated 50 token-ring vendors, including IBM, according to patent attorneys familiar with the case.

Amending the patent could also negate any claims Soderblom might pursue regarding the 100M bit/sec fiber-optic FDDI LAN technology, which is based on a token-passing scheme.

Al Smith, a director in the Patent Office, said the office would not comment on the particulars of any reexamination issue. But Smith noted, "It's highly unusual in the reexamination process for a patent to be reissued in its original form. There are usually some amendments or claims that are found not to be patentable."

Smith noted that patent reexaminations are not easily granted. "Reexaminations look at patents in light of publications that weren't before the examiner when the original patent was examined. There must be a substantial question [about the patent's validity]. Otherwise, this office doesn't order a reexamination."

News of the Patent Office's decision to reexamine Soderblom's patent was greeted with elation by token-ring and FDDI vendors. "We're delighted," said Ed Murray, director of North American operations for Madge Networks, Ltd. in London, which is in litigation with Soderblom and has petitioned the Federal District Court to have Soderblom's patent declared invalid.

"We've said all along that this patent doesn't apply to our token-ring technology. We applaud the Patent Office's decision to settle the matter," Murray said.

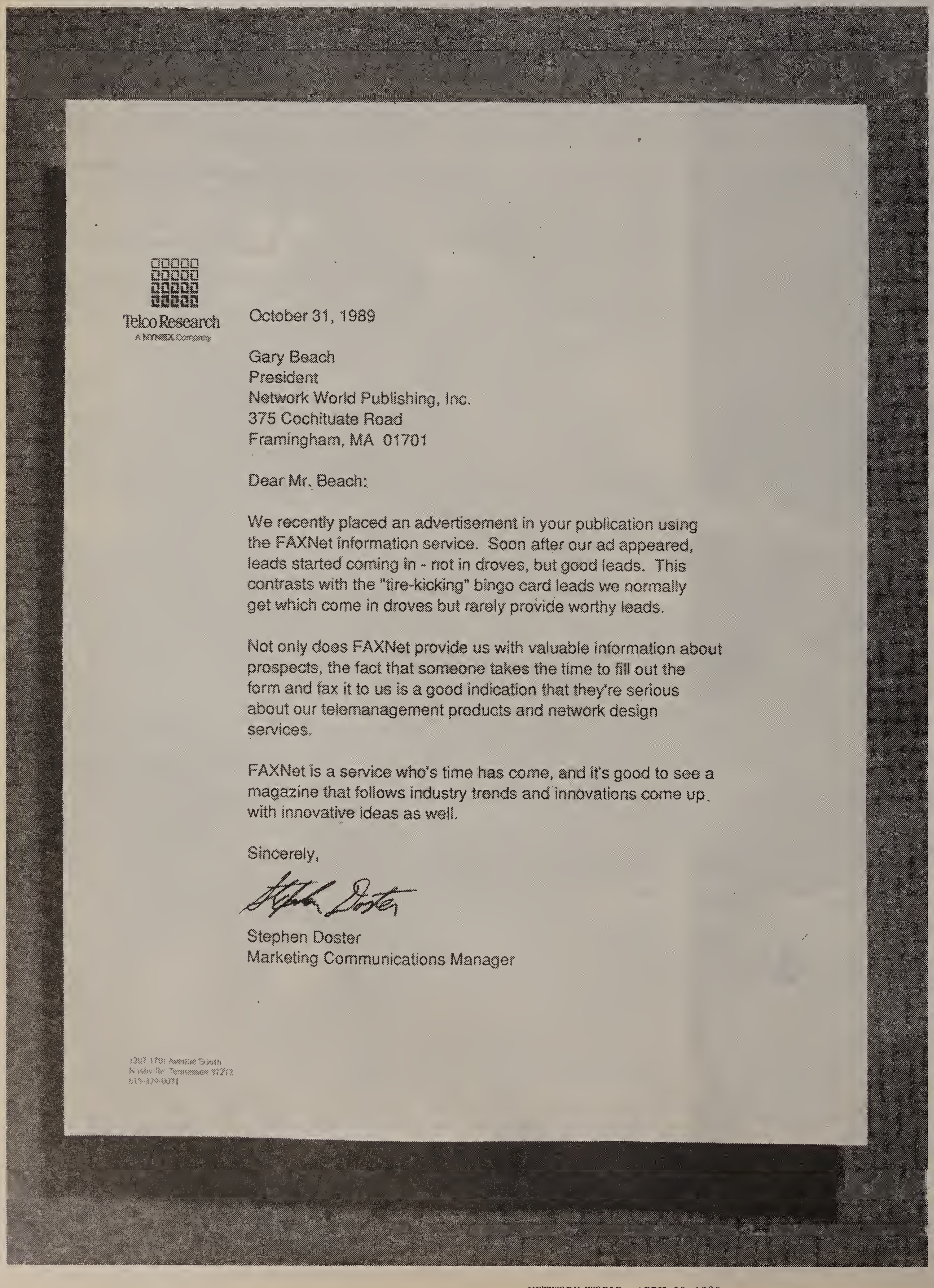
Roger Borovoy, a patent attorney with Brown & Bain Co. in Palo Alto, Calif., said that "should the Patent Office amend Soderblom's very broad-based patent to require a master/slave token-passing data transmission scheme and force him back to his claims in the original 1981 document, his patent will be worthless" in terms of collecting royalties.

The president of an FDDI company who requested anonymity expressed similar sentiments, adding, "I've never met anyone except Soderblom and his attorneys who believed his patent applies to today's token-ring technology, let alone FDDI. Soderblom has basically collected a lot of money for a nebulous patent."

Soderblom disagree. "We are absolutely confident that when it is reexamined, the issue of prior art will be found to be without merit because neither one of the patents cited shows a token-passing scheme," he said.

"Nobody likes the guy who collects the rent. But I'm not sitting on the beach collecting money for work I haven't done," Soderblom told *Network World* during an interview earlier this month. "I'm confident the courts and the Patent Office will bear this out in their decisions."

If the Patent Office's reexamination decision goes against him, Soderblom can appeal the decision to the Patent Office's internal Board of Patent Appeals and Interferences, file a civil action in Federal District Court to direct the commissioner to issue the patent, or file an appeal to the Court of Appeals for the Federal Circuit. "We'll take the time we need, but we won't be dragging it out," said George Van de Sande, Soderblom's attorney. "It will take less than a year to conclude."



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Stephen Doster

Stephen Doster
Marketing Communications Manager

AT&T Tridom to test European VSATs

continued from page 2

vendor, based here.

"We see the regulatory environment changing and expect to be able to have a commercial offering in the relatively near future," Kennedy said.

AT&T Tridom is teaming with London-based carrier Mercury Communications, Ltd. to provide VSAT services. Mercury Communications and the U.K.'s dominant carrier, British Telecommunications PLC, currently supply VSAT services within the U.K. only.

In the trial, AT&T Tridom will use a Mercury Communications earth station overlooking the Thames River as a shared hub for service to user locations in Europe.

The net will use satellites to carry data traffic from user sites to the shared hub, which will route data over dedicated 56K and 64K bit/sec terrestrial circuits to host computers in London and the U.S. AT&T Tridom will monitor operations on the VSAT nets from its own network management center here, which will be tied to the shared hub via a dedicated 56K bit/sec link.

Kennedy declined to name any users participating in the trial. AT&T Tridom also has not yet determined which countries, besides the U.K., will contain VSAT network nodes. One country where AT&T Tridom is likely to win approval for the trial is West Germany because that country is now in the process of legalizing VSATs. Other countries the vendor is focusing on include France, Italy and Spain, Kennedy said.

Several U.S. users have said they are interested in building pan-European VSAT nets because it would enable them to avoid dealing with multiple carriers and multiple terrestrial technologies ("EC, carriers move toward liberalizing VSAT market," *NW,* March 5). But due to restrictive carrier regulations, only about 345 VSAT dishes are installed in Europe, vs. more than 20,000 in the U.S., according to the London-based market research firm Communication Systems International, Ltd.

This year, however, the European Commission plans to release a position paper on VSAT nets that is expected to argue that the VSAT market should be opened up.

Tariff wars take toll on user

continued from page 2

for a three-year contract.

RCI declined MCI's bid, deciding to accept AT&T's offer primarily due to the extra cost it would have incurred from converting 800 numbers from AT&T to MCI.

AT&T was RCI's existing primary provider.

But the deal came to a screeching halt last January when the FCC suspended AT&T's Tariff 15 for five months to investigate the legality of below-tariff deals. The FCC is using the time to conduct an investigation into the question of whether AT&T and MCI should be allowed to make below-tariff offers.

> "Before MCI came to present its proposal, the proposal had to be approved by 'corporate.' MCI would have you believe that its proposal was presented by one overzealous salesperson."

▲▲▲

To make matters worse, RCI's contingency plan, the MCI deal, has vanished. MCI told the FCC it withdrew the bid because it was unauthorized and said the offer would not be revived under any circumstance.

As an explanation, MCI told the commission the bid was made not "pursuant to established company procedures and was inconsistent with MCI's large account pricing program and guidelines."

According to Jim Bauerle, RCI's director of office automation, MCI never told his company the offer was withdrawn. He had to find that out from the FCC.

After learning that the MCI option was out, RCI Vice-President Charles Patton fired off a letter to FCC Chairman Alfred Sikes, the other FCC commissioners and Common Carrier Bureau Chief Richard Firestone.

In that letter, RCI disputed any notion that negotiations with MCI were in any way unauthorized. Patton said negotiations with MCI were very professional, contrary to how MCI portrayed the events in its letter to the FCC.

Patton said in his letter, "Before MCI came to formally present its proposal, we were told that the proposal had to be approved by 'corporate.' MCI would have you believe that its proposal was presented by one overzealous salesperson. This is not the case." Bauerle said that the final offer from MCI came from both the account representative and MCI's Midwest division manager.

The withdrawl of the MCI bid and suspension of AT&T's offer has not only put RCI's business decisions on hold — some as simple as which 800 numbers to put on brochures — it has also eliminated savings that RCI wanted to redirect into other company budget sectors.

Because the company is not in a firm position to project telecommunications expenses for the year, the budget process for the entire company has been affected.

Although the FCC is scheduled to decide the RCI Tariff 15 issue in late June, there are signs that the Common Carrier Bureau will not be prepared to give a clear answer at that time.

If the commission does not reject the tariff outright, it could choose to simply let the RCI Tariff 15 offer go into effect subject to a later decision. Firestone noted that the FCC has 12 months to investigate, and the commission has only used up five months. "The only way an investigation ends is when the commission issues an order," Firestone said.

"It would take a final commission order to keep [the RCI Tariff 15] from going into effect," Firestone explained. The FCC does not want to resolve major industry issues in the context of one tariff filing. "That's why we've started fundamental proceedings on AT&T in a rule-making procedure."

For its part, RCI is trying to endure, hoping the FCC will approve the AT&T offer in June. "We believe in free competition in the marketplace," Bauerle said. ◘

Vendors team up for FDDI

continued from page 2

The FDDI Consortium, which will be based at UNH, has several goals: to provide an independent site where FDDI products can be tested in a heterogeneous environment, to spearhead development of FDDI test suites and to serve as a forum where technical information related to FDDI product interoperability can be exchanged.

Partners in FDDI product testing

Charter members of the FDDI Consortium that have committed to interoperability testing of products at the University of New Hampshire Interoperability Lab:

- ☐ BICC Data Networks, Inc.
- ☐ Cabletron Systems, Inc.
- ☐ Apollo Division of Hewlett-Packard Co.
- ☐ National Semiconductor Corp.
- ☐ Network Systems Corp.
- ☐ Prime Computer, Inc.
- ☐ Proteon, Inc.
- ☐ Sun Microsystems, Inc.
- ☐ Synernetics, Inc.
- ☐ Wellfleet Communications, Inc.

SOURCE: UNIVERSITY OF NEW HAMPSHIRE, DURHAM, N.H.
GRAPHIC BY SUSAN J. CHAMPENY

The UNH Interoperability Lab earlier this year sponsored the creation of the 10BaseT Consortium. That group was formed to ensure that products based on the draft version of the IEEE 10BaseT standard for running Ethernet over unshielded twisted-pair wiring would work together in multivendor nets ("Vendors set up consortium to test 10BaseT products," *NW*, Feb. 19).

Interestingly, the FDDI Consortium's efforts are strikingly similar to those of the Advanced Networking Group (ANG), which is sponsored by FDDI chip maker Advanced Micro Devices, Inc. (AMD) and boasts 88 members, including Fibronics International, Inc. and Proteon, Inc. The ANG testing facility is expected to open this summer.

A major difference between the two groups is that ANG members' products are based on AMD's chipset, whereas the UNH group provides for a more independent environment, Reinhold said. The two groups are expected to work together, rather than compete.

Some vendors that have already committed to forming the FDDI Consortium have begun setting up a multivendor FDDI network at UNH for informal testing.

These vendors include BICC Data Networks, Inc., Cabletron Systems, Inc., HP, National Semiconductor Corp., Network Systems Corp., Prime, Proteon, Sun, Synernetics, Inc. and Wellfleet Communications, Inc.

UNH is encouraging vendors to hook their FDDI products to the network before the FDDI Consortium is made official. After July 9, they will be required to be consortium members and pay a $6,000 annual fee. ◘

Test site uses Internet Portal

continued from page 4

that runs on DEC's DECsystem 3100 workstation and enables users to route TCP/IP traffic over DECnet backbones. The product is central to DEC's strategy to enable users to employ DECnets to support multiple types of traffic.

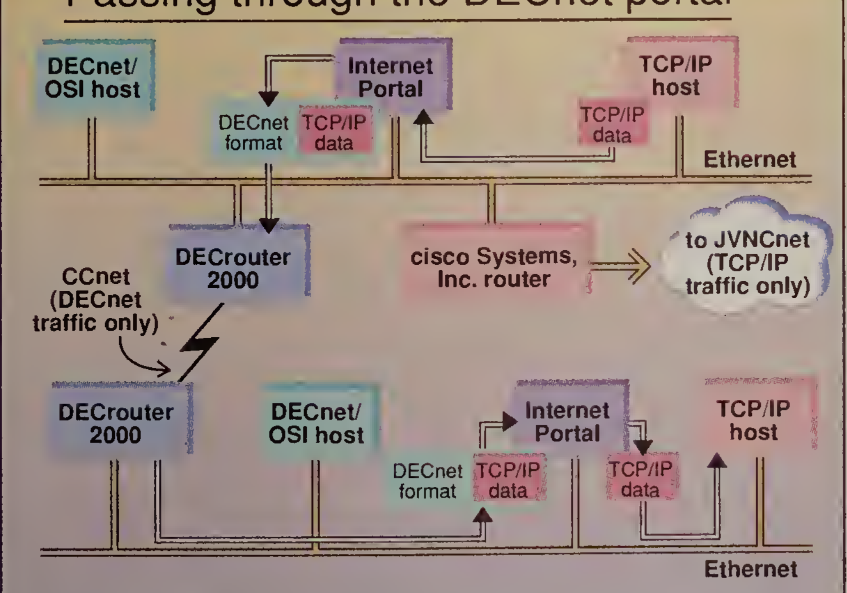
The device ties TCP/IP machines on the Institute's Ethernet to devices on remote Ethernets over the CCnet regional research net, which is based on DECnet. The Ethernets support both DECnet and TCP/IP traffic.

CCnet enables the institute to access devices at Pittsburgh Supercomputer Center, Columbia University in New York and more than a dozen other East Coast universities. Each CCnet location is equipped with a DECnet router, such as a DEC DECSA, DECrouter 2000s or VAXes configured as DECnet routing nodes. The routers are linked via dedicated circuits operating at between 9.6K bit/sec and 56K bit/sec.

In the beta test, Stevens Institute used the Internet Portal to route TCP/IP traffic to another university. Other CCnet sites now have Internet Portals, but Maltz said it is difficult to determine an exact number because other sites are not required to register their portals as backbone devices.

By introducing the Internet Portal, DEC shows it is interested in routing more than just DECnet traffic across backbone links, Maltz said. "It's good that DEC is now paying more attention to TCP/IP," Maltz said.

Passing through the DECnet portal



Internet Portal packetizes TCP/IP data into DECnet format for transmission across DECrouter 2000 nodes, which support DEC's Digital Data Communications Message Protocol for wide-area transport only.

GRAPHIC BY SUSAN SLATER SOURCE: STEVENS INSTITUTE OF TECHNOLOGY, HOBOKEN, N.J.

Installed almost a year ago, the portal enables TCP/IP nodes that want to reach remote TCP/IP devices to send requests for connection to the portal. The portal then wraps the TCP/IP packet in a DECnet envelope and forwards it to Stevens Institute's DECnet router.

The router uses DEC's Digital Data Communications Message Protocol to pass the DECnet packet to a router at the target CCnet site. That router forwards it to another Internet Portal, which strips away the DECnet envelope and forwards the packet to the target system.

Maltz said there are other options for supporting TCP/IP on a DECnet backbone, but none that are as easy and cost-effective as the Internet Portal, which is priced at $9,500.

For example, users can load TCP/IP and DECnet software on a VAX attached to the local Ethernet. TCP/IP traffic destined for remote sites would be routed to that VAX, which would convert it to DECnet protocols and route it to the remote site. A similarly configured VAX at the remote site would translate DECnet back to TCP/IP protocols and forward the data to the target host.

However, few users would implement such a solution since it is cumbersome and CPU-intensive, Maltz said. "There are other ways to do this, depending upon how much pain you want to go through. The Internet Portal is probably the most painless."

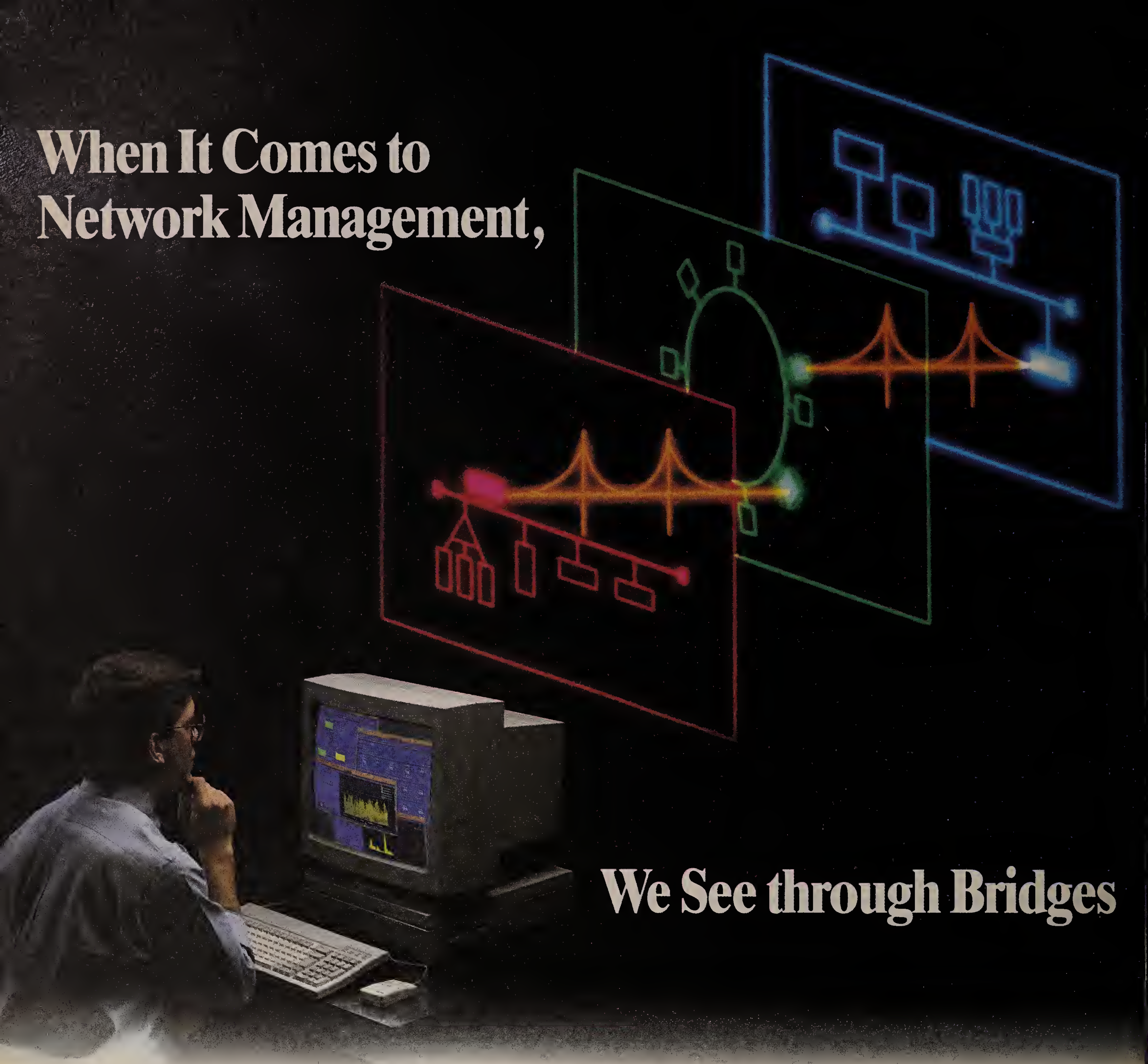
It was also easy to install, Maltz said. It took about 15 minutes to attach the Internet Portal to the Ethernet and bring it up.

Besides providing a quick and easy way to connect TCP/IP devices, the institute found the Internet Portal could be used to back up an existing TCP/IP link to the John von Neumann National Supercomputer Center network (JVNCnet).

JVNCnet links the institute to a number of other locations, including the Massachusetts Institute of Technology in Cambridge, Mass., and the John von Neumann National Supercomputer Center in Princeton, N.J. Routers at the latter site link Stevens Institute to the nationwide Internet.

Once, when the JVNCnet link went down, Maltz said traffic destined for JVNCnet was routed to the Internet Portal and through DECnet routers to a CCnet site with a functioning JVNCnet link. However, she said JVNCnet links can not back up failed CCnet circuits since JVNCnet does not route DECnet traffic.

DEC rolled out the Internet Portal and its companion product, the X25portal 2000ok for routing X.25 traffic over DECnet links, as part of its strategy to position DECnet as a multiprotocol backbone option. This will obviate the need for users to lease multiple circuits, each supporting a different protocol. ◘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